

**NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
AND
CONSUMER SERVICES**

PLANT INDUSTRY DIVISION

2006 ANNUAL REPORT



STEVE TROXLER, COMMISSIONER

January 1, 2007

To the Honorable Steven W. Troxler, Commissioner of Agriculture and Members of the Board of Agriculture

On behalf of the entire NCDA&CS Plant Industry Division staff, I am pleased to provide this summary and overview of activities conducted by Divisional staff. The last year brought significant changes to the North Carolina Department of Agriculture and Consumer Services' Plant Industry Division. Bill Dickerson, a long-term staff member, who had served as Plant Pest Administrator and most recently as Plant Industry Division Director, retired after 19 years of state service. Following Bill's retirement, Commissioner Troxler appointed me to serve as the new Plant Industry Division Director. I am excited to be able to continue to serve the citizens of this state and the staff of the Plant Industry Division. I have a long history with the Plant Industry Division and look forward to utilizing this historical knowledge along with new approaches and strategies. Since moving into this new role, my initial focus has been centered on four strategic directives:

1. A strong commitment to retain, recruit, and train high quality staff in the Plant Industry Division
2. Implementation of technically sound regulatory and service programs that ensure our seed and fertilizer and other soil additives in North Carolina meet prescribed standards and are truthfully labeled.
3. Implementation of technically sound regulatory and service programs to protect the cultivated plants, plant products and other beneficial organisms of this state from introduced pests and implementation of programs designed to protect native flora of this state.
4. Develop both short and long-term strategic plans for the Plant Industry Division ensuring our program goals/objectives, organizational structure and accountability are on pace with numerous changes in the agricultural community.

There have already been great strides in these focus areas. During 2006, Divisional staff recruited Karen Hess, Agricultural Research Technician I, Laura Gadd, Agricultural Research Technician II, Dustin Mercer, Mechanic I, Daniel Bunce, Agricultural Research Technician, I, Georgia Brock, Administrative Officer II, Rick Iverson, Weed Specialist, and Dr. Lane Kreitlow, Entomological Program Specialist. Along with these newest staff members, our Plant Industry Division staff are among the most knowledgeable and dedicated personnel in state government.

To accomplish our expanding mandates, the Plant Industry Division's state-appropriated budget was just over \$5.2 million with a total staff of 94. The Plant Industry Division continues to work cooperatively with its federal partners in multiple cost-share programs with over \$2.167 million obtained in support of plant pest program work. The Plant Industry Division also received \$4,463,424 in grant funds from the Natural Heritage Trust Fund that permitted our program to purchase new preserves or additional acreage in

existing preserves in the state. The Plant Industry Division continues to develop its partnerships with other state organizations or other groups in order to accomplish its overall mission.

The Plant Industry Division staff sincerely appreciates the trust that the citizens and leaders of North Carolina have placed in us as both a regulatory and service agency within the North Carolina Department of Agriculture and Consumer Services. We remain committed and determined to fulfill the mission and objectives that you have outlined for us.

Respectfully submitted,

Gene B. Cross
Division Director
NCDA&CS Plant Industry Division

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Term expires 5/1/09

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Roger D. Oxendine
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Elbert R. (Bert) Pitt, Jr.
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Douglas (Doug) Torn
(Marketing - green industry)
Term expires 5/1/11

Jeffery B. (Jeff) Turner
(Tobacco)
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PLANT PROTECTION SECTION

The Plant Protection Section is responsible for implementing laws enacted by the North Carolina General Assembly to protect North Carolina agriculture and its citizens from the entry, establishment, release, and spread of injurious organisms into or within North Carolina.

The mission of the Plant Protection Section is to enhance the quality of life in North Carolina by protecting agriculture and the environment from injurious plant pests, by promoting beneficial organisms, and by protecting rare native plants of the state.

We serve the people of North Carolina by:

- Protecting agricultural crops, horticultural crops and native flora, by preventing or controlling the invasion and spread of injurious insects, plant pathogens, weeds, and other pests of regulatory concern.
- Protecting honey bees by combating the spread of bee pathogens.
- Responding to constantly changing threats to crops, rare native plants, and honey bees by drafting effective and reasonable regulations and by achieving public compliance.
- Supporting agriculture, horticulture and related industries by providing inspection and export services to facilitate the movement of regulated commodities.
- Protecting rare native plants by restoring their habitats, and by propagating and restoring them to the wild.
- Promoting beneficial organisms that serve as biological controls of pest species.
- Providing outstanding service and satisfaction to all our clients.

North Carolina has an extremely wide range of climate, from near tropical along the southeast coast to winter conditions similar to southern Canada in our higher mountains in the west. Such diversity provides suitable environments for an extremely diverse flora and fauna. Extensive international air and sea transportation, both military and commercial, and an extensive Interstate Highway System increase the potential for the accidental introduction of pest organisms into North Carolina. Therefore, North Carolina's Plant Protection Section programs must deal with a wide range of organisms and host-pest interactions.

Major program activities for 2006 included the following:

Apiary Inspection Program

The Apiary Inspection Program of NCDA&CS, Plant Industry Division is both service and regulatory in nature, with the aim of maintaining a thriving bee and honey industry in the state. North Carolina produces a wide range of agricultural crops, many of which rely upon insect pollination, especially from honey bees, to boost production and quality. Several diseases and pests attack honey bees, and through inspection, regulation, and education, the Apiary Inspection Program works to protect this valuable asset.

The *Varroa* mite continues to be a major threat to the beekeeping industry in North Carolina. Several new products have been registered for use in controlling this pest; however, the mites have quickly developed resistance to some of these materials. Another concern is the growing use of unregistered materials that may or may not be effective, and may be harmful to long term

colony health. This and, in some cases, the improper use of antibiotics can further complicate useful treatment regimes.

Another threat facing the beekeeping industry of North Carolina is the establishment of Africanized honey bees (AHB) (*Apis mellifera scutellata*) on the eastern seaboard (southern Florida). NCDA&CS' staff is engaged in an outreach program to emergency response personnel to familiarize them with the potential threat of AHB. Another aspect of this outreach effort is directed at the structural pest industry and its membership. NCDA&CS and North Carolina State University are collaborating on a survey to determine the geographic origin and the propensity for increased defensive behavior of managed bees in NC. At the time of this report none of the samples collected were determined to be of the AHB type. Staff continues to encourage beekeepers to advise staff of any colonies that seem to be displaying any unusual or inexplicable defensive behavior in order to maintain a beekeeping industry in North Carolina that is not threatened by the reputation of this more defensive type of bee.

NCDACS continues to enjoy a good working relationship with our collaborators at NCSU. NCDACS' staff continues to assist them in some of their projects and would like to express gratitude for their assistance in many of our projects.

NCDA&CS' Apiary Inspectors continue to assist the beekeepers through field inspections, educational meetings, and field days, and to make every attempt to be available to assist the beekeepers in any way necessary. The number of colonies documented for inspection for 2006 is 11,533, with 115 hives positive for American Foulbrood.

Biological Control Programs

Biological Control Program activities remain focused primarily on exotic pests including the cereal leaf beetle, *Harmonia axyridis*, hemlock woolly adelgid, and imported fire ant. Following are brief summaries of these projects.

Cereal Leaf Beetle (CLB), Parasitoid Rearing. One insectary to rear parasitoids of *Oulema melanopus*, a pest of small grains, was operated at the Piedmont Research Station near Salisbury during 2006. For the sixth year, larvae parasitized by *Lemophagus curtus* were found at Salisbury. The insectary now contains the aforementioned species and *Tetrastichus julis*, as well as the egg parasitoid, *Anaphes flavipes*. To assist *A. flavipes* rearing efforts in the western US, about 400 CLB adults were collected at the Piedmont Research Station and NCSU Farm Unit 2 and shipped to the Colorado Department of Agriculture.

***Harmonia axyridis*.** Studies on the introduced multicolored Asian lady beetle *Harmonia axyridis* were continued during 2006.

Two light traps were run on the grounds of the Beneficial Insect Laboratory (BIL) between 14 August and 29 September 2006 and all coccinellids collected. The insects were preserved, packaged and shipped to cooperators at the State University of New York; they are studying infection patterns of the fungus *Hesperomyces virescens* on the beetle. October 30 to 7 December an experiment was set up to investigate behavioral patterns of transmission of the

fungus *H. virescens* among *H. axyridis* during the winter aggregation period. The study is ongoing, with results to be tabulated in spring of 2007.

August 23-26 and September 15-17 studies were conducted to determine the diurnal timing of *Harmonia* flight to outdoor blacklight traps; the data are currently being analyzed.

One paper is currently in press and will be published in the Journal of Invertebrate Pathology before the end of the year:

Nalepa, C.A., and A.Weir. Infection of *Harmonia axyridis* (Coleoptera: Coccinellidae) by *Hesperomyces virescens* (Ascomycetes: Laboulbeniales): role of mating status and aggregation behavior.

Hemlock Woolly Adelgid, Predator Rearing. A native of Asia, this pest attacks hemlock trees, settling onto branches and sucking sap from the base of the needles. Widespread infestations have been found in North Carolina, in a variety of situations from specimen trees in landscapes to large stands in natural areas. Since chemical treatment is so difficult, a biological control program is being initiated in cooperation with the USDA Forest Service and USDA APHIS PPQ. An insectary was established in our Cary lab in 2002 to rear a small predatory beetle, *Sasajiscymnus tsugae* (= *Pseudoscymnus tsugae*), a host-specific predator. The operation has expanded each year. About 120,000 beetles were turned over to the Forest Service for release at selected sites during 2006. Plans call for rearing 150-200,000 beetles in the coming year.

Imported Fire Ant. *Phorid Fly Overwintered and Spread in Wake Co.* The phorid fly *Pseudacteon curvatus* was released in Wake County over a two-week period in April 2005. A total of six generations were recovered through December, and flies were found approximately ¼ mile from release mounds. Monitoring resumed in spring 2006 when temperatures returned to an average of 70°F. A total of seven generations of flies were found through November. Flies were found approximately 5.0 miles from the release site. Monitoring of flies will resume next year when warmer temperatures return.

New Release of Phorid Flies. Approximately 3,639 phorid flies (*Pseudacteon tricuspis*) were released in Pitt County, NC over a two week period in September 2006. The first recovery of flies occurred 50 days after the initial phorid fly release. Only one generation of flies was found before temperatures dropped too low for fly activity. The previous release sites (*P. tricuspis*) in Wayne, Duplin and Robeson Counties were monitored during the fall, but no flies were collected at any of the sites.

Business Continuity Plan. A Business Continuity Plan using the Living Disaster Recovery Planning System (LDRPS) was developed for Plant Industry to use in the event of a major disaster. The plan lists business processes, copies of pertinent forms, regulations and data, supplies and equipment necessary for operations, call lists, assignment of teams with a list of tasks to keep Plant Industry functional during and after a disaster. Copies of the plan were given to Supervisors to keep at home.

Cooperative Agriculture Pest Survey (CAPS) Program

The Cooperative Agricultural Pest Survey (CAPS) is a joint initiative between the USDA APHIS PPQ and the NCDA&CS to fund and implement domestic surveys of harmful or economically significant plant pests and weeds that have not been detected by front-line inspections at our ports of entry. These surveys are necessary to safeguard our nation's agricultural and natural resources by detecting early pest infestations or introductions which validates our trading partners concerns for pest status. Typical surveys target exotic pests, pests of export significance and pests that are not known to occur in the U.S., but can also include regionally established pests. A strong domestic pest detection infrastructure and headquarters/regional staff is vital to ensuring that scientifically valid, current, and reliable pest/disease survey data is available on a continuing basis. Additionally, staff support is also critical at the state level and federal funding provided for a State CAPS Survey Coordinator position to be housed within the NCDA&CS' Plant Industry Division, Plant Protection Section.

The State CAPS Committee met twice at the NCDA Beneficial Insects Laboratory in Cary on April 19th and May 16th. For an overview for the CAPS Program, Drs. Ken Ahlstrom and Steve Schmidt attended the National CAPS meeting during November in Raleigh, North Carolina.

Summary of 2006 Core Project Surveys

Dogwood Anthracnose

Dogwood Anthracnose is a disease of both the native and ornamental cultivars of flowering dogwood. It has been causing widespread mortality of dogwood in the northeastern U.S. since the mid 1970's. In 1987, the disease was confirmed in western North Carolina and northern Georgia. It is now confirmed in 24 western North Carolina counties. The North Carolina Forest Service (NCFS) has established and maintains 40 impact plots in infested counties and monitors them on a yearly basis. Approximately 56% of the dogwoods present on the original 40 plots have died from dogwood anthracnose infections. The purpose of this project (no federal funds, only data collection) is to continue monitoring tree status on the original 40 impact plots and to establish additional plots on the leading edge of the infected area to determine rate of spread. In summary, the NCFS noted that for this season, 29 counties were positive for the disease. Because of personnel losses, the NCFS indicated that this survey will be conducted every three years with the next survey scheduled for 2009.

Oak Wilt Survey

Oak Wilt is the most serious fungus disease affecting oaks. It is currently found in 20 states. North Carolina has a history of oak wilt dating from 1951. Since that year, a progressive program has been initiated each year to locate and eradicate all confirmed oak wilt trees. The disease is primarily confined to five western North Carolina counties. The annual aerial/ground survey of positive and adjoining counties has helped to isolate, monitor, and document the presence of the disease for oak log exporting concerns. The purpose of this survey is to continue aerial and ground surveys to determine the distribution of Oak Wilt disease in affected and adjoining counties. Further, the NCFS will conduct eradication/suppression activities on those oak trees with laboratory confirmed oak wilt. Finally, the NCFS will document the location of active oak wilt centers. As with dogwood

anthracnose, the NCFS indicated that this survey will be conducted every three years with the next survey scheduled for 2009.

Summary of 2006 Exotic Pest Survey Projects

Wood Boring/Bark Beetle Survey

Although this survey is conducted primarily by USDA APHIS PPQ personnel, NCDA&CS' Field Specialists were alerted, as part of their survey activities, to be on the watch for the Asian Longhorned Beetle and Emerald Ash Borer statewide and the Japanese Cedar Longhorned Beetle in Dare County. None were detected.

European Wood Wasp

This pest is a native of Europe, Asia, and northern Africa. It has become established in South Africa, South America, Australia and New Zealand. A serious threat to living conifers, it has caused 80% mortality at loblolly pine plantations in Argentina. Within the last three years, it has become established in 18 counties in New York and two in Pennsylvania. Working in conjunction with the NCFS, intercept traps were set out in pine forests and plantations in the following counties: Alexander, Beaufort, Bladen, Brunswick, Burke, Caldwell, Catawba, Franklin, Granville, Iredell, Moore, New Hanover, Onslow, Person, Pitt, Richmond, Rutherford, Wake, and Wilkes. Examination of the collected samples confirmed the absence of this pest in North Carolina.

Malaise trapping for overseas pests

With numerous military facilities located in North Carolina and with the current state of affairs globally, exotic pests could easily be transported on military equipment returning to the U.S. from overseas.

The purpose of this project was to set up Malaise traps with an alcohol-collecting head at two military sites in North Carolina to determine if exotic pests could be found hitchhiking on military cargo returning from overseas. Traps were set at the Military Ocean Terminal Sunny Point in Brunswick County and Camp Lejeune in Onslow County. Traps were monitored weekly and alcohol bottles collected. Alcohol collections at Camp Lejeune were examined by Marine Corps personnel and insects of interest to them (mosquitoes and flies) were removed for further study. After consulting marine personnel and examining the remaining collected materials, no exotics were found.

EXOTIC NURSERY PESTS

Inula britannica

Inula britannica L. is a rhizomatous perennial or biennial of the aster family. Native to Europe and Asia, it is now widespread in the Palearctic Region, occurring from Spain to Japan and north to Scandinavia and Siberia. It occurs primarily in moist habitats including ditches, stream banks, wet woods, and moist meadows. It has become an aggressive weed in field grown hostas in the Netherlands and has been introduced into North America. It has the potential to become a serious weed pest in the U.S. It has been found at several hosta nurseries in Michigan and was detected in hosta plants in Wilson County, North Carolina in 2000-01. Eradication measures were conducted and no further detections have occurred.

The objective of this project was to determine the presence or absence of *Inula* in hosta plant material in North Carolina. The approach was to utilize existing NCDA&CS' field personnel to survey for *Inula* as part of their routine nursery and nursery dealer inspections. No *Inula britannica* infestations were found in North Carolina in 2006.

Snail and Slug Survey

There are numerous pathways now present for the introduction of new plant pests, including snails and slugs. Many of these are or could be moderate to serious pests of agricultural crops. In addition, some are known to carry diseases that affect humans as well as livestock.

The purpose of the outlined survey was to determine the presence of possible new snail introductions in North Carolina. All specimen collected were to be sent to the proper authorities for inclusion in the DNA analysis program of the North American Slug Project. Some surveys during the summer were accomplished by the part-time technician assisting the State Survey Coordinator. The railyard at Hamlet, North Carolina was surveyed several times by the technician during the summer. This site was selected because it is the major hub for east-west and north-south rail traffic in North Carolina. Snails in other parts of the country have been found in close proximity to large rail yards with heavy containerized traffic. None of the targeted snails were found. Although some snails were collected, they all proved to be native species.

In addition, USDA APHIS PPQ personnel conducted surveys at several commercial sites dealing with tile imports. Some suspect snails were found, but identification determined them to be natives.

NCDA&CS' Field Specialists were requested to survey for snails and slugs as a component part of their nursery/nursery dealer inspections. In North Carolina, there are approximately 1,800 nurseries and nearly 2,300 nursery dealers. No suspect snails or slugs were found by NCDA&CS' field personnel.

Pink Hibiscus Mealybug

Pink Hibiscus Mealybug is a serious threat to agriculture in the U.S. because it can attack over 200 plants. In North Carolina, hosts include: corn, cotton, cucumber, grape, hibiscus, okra, peanuts, pumpkin, rose, and soybeans.

NCDA&CS' Field Specialists were requested to visually survey for pink hibiscus mealybug as a component part of their nursery/nursery dealer inspections. No suspect specimens were found in 2006

EXOTIC FRUIT PESTS

Fruit Tree Tortrix Moth

This moth pest is currently established in British Columbia and was trapped in Washington state. In North Carolina, this moth has the potential to be damaging to fruit of apples, plums, and blueberries. In addition, this moth is capable of feeding on many forest and ornamental trees including maple, oak, elm, walnut, birch, hawthorn, and many others. Wing traps were placed in abandoned apple orchards in three western counties, Avery, Mitchell, and Watauga,

and were monitored monthly during the summer. No Fruit Tree Tortrix Moth adults were detected.

Summer Fruit Tortrix Moth

This moth pest has two generations per year and is a serious pest of apples, pears, and peaches. The first generation larvae feed on leaves and flowers of host plants with adult emergence occurring in June. Second generation larvae feed on the fruit. Adult emergence occurs in August. At the present time, this moth is not known to be present in the U.S. Wing traps were placed in abandoned apple orchards in three western counties, Avery, Mitchell, and Wilkes, and were monitored monthly during the summer. No Summer Fruit Tortrix Moths adults were detected.

Light Brown Apple Moth

This moth is a highly polyphagous pest of over 120 plant genera in over 50 families with a preference for hosts in the Compositae, Leguminosae, Polygonaceae, and Rosaceae. Some host plants are: apple, blueberry, camellia, grape, oak, persimmon, pine, potato, strawberry, and viburnum. While this pest has been intercepted at several ports of entry in the U.S., it has failed to become established. Wing traps were placed in abandoned apple orchards in three western counties, Avery, Mitchell, and Wilkes, and were monitored monthly during the summer. No Light Brown Apple Moth adults were detected.

EXOTIC COTTON PESTS

Pests of cotton for which surveys were conducted in 2006, were the Egyptian Cotton Leafworm (ECW), Rice Cutworm (RC), False Codling Moth (FCM), and Old World Bollworm (OWB). These are all multivoltine species that pose a high degree of risk to U.S. agriculture ecosystems.

ECW is native to the Mediterranean area, the Middle East, and much of Africa. RC is found in Asia and Africa; FCM is endemic to sub-Saharan Africa. OWB can be found in Africa, Asia, Australia, the western Pacific region, and the Middle East. All of these pests are highly polyphagous and combined can infest more than 40 families of plants. Traps were set, baited and monitored by NCDA&C' regional agronomists and by personnel with USDA APHIS PPQ. Traps were placed in Anson, Beaufort, Bertie, Cleveland, Craven, Edgecombe, Greene, Halifax, Hyde, Johnston, Lenoir, Martin, Nash, Pitt, Richmond, Stanly, Union, Wake, Warren, Wayne, and Wilson counties. Traps were examined at the end of the season. No suspect exotics were observed.

OTHER EXOTIC PESTS

Viburnum Leaf Beetle

The Viburnum Leaf Beetle is a serious pest of viburnum, a valuable landscape plant. Heavy infestations can defoliate shrubs, cause dieback, and eventually kill the plant. The beetle known range is Ohio, Pennsylvania, New York, Vermont, New Hampshire, Massachusetts, and Connecticut. Visual surveys were conducted in Ashe, Avery, Mitchell, Watauga, and Wilkes Counties by both NCDA&CS and the NCFS personnel. No evidence of Viburnum Leaf Beetle was detected.

Soybean Aphid and Soybean Pod Borer

Soybean Aphid is a recently introduced pest of soybeans in the U.S. Originally, a native of China and Japan, it was first identified in the U.S. in the summer and fall of 2000 in several Midwestern states. Like most aphids, it is able to build high populations in a short period of time. Infestations that peak at the bloom stage can stunt the plants producing fewer pods, thereby lowering yields. Currently, this aphid is the only one in North America capable of developing large populations on soybeans. It has been detected in Virginia counties bordering North Carolina. Visual surveys were conducted in northeastern North Carolina. Soybean aphid was detected in soybean fields in Camden, Currituck, and Gates Counties.

Soybean Pod Borer is a pest of legumes in tropical and subtropical regions of the world; central and southern Africa; Southeast Asia from India to Japan and Australia; several Pacific Islands including Hawaii; southern Mexico to tropical South America, including the West Indies. Although plants are not killed, a large proportion of the pods may be damaged and unmarketable. Visual surveys conducted by the North Carolina Cooperative Extension Service personnel found no evidence of this pest in North Carolina.

National Agricultural Pest Information System (NAPIS) Data Entry for North Carolina

The State Survey Coordinator is responsible for submitting survey results to the NAPIS Database. Organisms for which data was entered in 2006:

Diseases

- Sudden Oak Death – *Phytophthora ramorum*
- Austro-Asian Soybean Rust – *Phakopsora pachyrhizi*

Mollusks

- Striped snail – *Ceratomyxa virgata*
- Hygromiid snails – *Xerolenta obvia*
Monacha cartusiana
- Golden apple snail – *Pomacea canaliculata*
- Helicarionid snail – *Ovachlamys fulgens*

Insects

- Emerald Ash Borer – *Agrilus planipennis*
- Asian Long-horned Beetle – *Anoplophora glabripennis*
- Japanese Cedar Longhorned Beetle – *Callidiellum rufipenne*
- Cereal Leaf Beetle – *Oulema melanopus*
- Viburnum Leaf Beetle – *Pyrrhalta viburni*
- Khapra Beetle – *Trogoderma granarium*
- Japanese Beetle – *Popillia japonica*
- Pine Shoot Beetle – *Tomicus piniperda*
- Spruce Bark Beetle – *Ips typographus*
- Sixtoothed Bark Beetle – *Ips sexdentatus*
- Redhaired Pine Bark Beetle – *Hylurgus ligniperda*
- Sixtoothed Spruce Bark Beetle – *Pityogenes chalcographus*
- A bark beetle – *Hylurgops palliates*
- Soybean Aphid – *Aphis glycines*
- Soybean Pod Borer – *Maruca vitrata*
- Pink Hibiscus Mealybug – *Maconellicoccus hirsutus*
- Africanized Honey Bee – *Apis mellifera*

Pink Bollworm – *Pectinophora gossypiella*
Gypsy Moth – *Lymantria dispar*
Egyptian Cottonworm – *Spodoptera littoralis*
Rice Cutworm – *S. litura*
False Codling Moth – *Cryptophlebia leucotreta*
Old World Bollworm – *Helicoverpa armigera*
Light Brown Apple Moth – *Epiphyas postvittana*
Summer Fruit Tortrix Moth – *Adoxophyes orana*
Fruit Tree Tortrix Moth – *Archips podana*

Weeds

Tropical Spiderwort – *Commelina benghalensis*
Meadow Fleabane – *Inula britannica*
Purple Loosestrife – *Lythrum salicaria*
Small Broomrape – *Orobanche minor*
Mile-A-Minute Weed – *Polygonum perfoliatum*
Giant Salvinia - *Salvinia molesta*
Witchweed – *Striga asiatica*
Tropical Soda Apple – *Solanum viarum*

Miscellaneous

A major accomplishment was analysis of data and the production of maps for two of our programs. The map generated for the Red Imported Fire Ant should be of benefit when redrawing the current quarantine line. The Sudden Oak Death program mapping results indicated those nurseries surveyed after receiving plants from infected counties in California and Washington.

Computer Resources

The Plant Protection Section utilizes a full-time Applications Analyst Programmer I in support of program activities. For 2006, this position provided support in the following areas:

Current Program and Database Development List with the Application and Maintenance ITS Assessment Database

1. Fertilizer Inspector Reporting System – Retired and database merged with seed inspector database.
2. Seed Inspector Reporting System – Retired and database merged with fertilizer inspector database.
3. FTSDInspection – version 1.0 is the merged Inspector reporting system and database for Seed and Fertilizer Section. In support of North Carolina Fertilizer and Seed Regulations. Fertilizer Inspectors provide regulatory inspection of fertilizer and lime offered for sale in North Carolina. Seed Specialists provide regulatory inspection of seed offered for sale in North Carolina. The program tracks the number of inspections and stop sales.
4. Gypsy Moth System version 1.1.11 – No new development, under review for porting to new .Net platform

5. NCForay (NCDA&CS Cotton Boll Weevil Automated Acreage Assessment Application)
- under review for porting to new .Net platform and move data to department SQLserver
6. Seed Analysis System Laboratory information System
 - a. Seed Input Laboratory Information System
 - b. Seed Purity Laboratory Information System User Interface (Manager version 2.1.7) – Completed
 - c. Seed Purity Laboratory Information System User Interface (Analyst version 2.1.9)
- Completed
 - d. Seed Planting Laboratory Information System (version 2.14) - Completed
 - e. Seed Germination Laboratory Information System (Analyst version 1.2.0) – Completed
 - f. Seed Germination Laboratory Information System (Manager version 1.0.0) – Continued Development
 - g. Seed Reporting Laboratory Information System – Continued Development
 - h. Seed Tetrazolium Laboratory Information System -
7. Noxious Weed Phytosanitary Tracking State – Database and user interface completed
8. Witchweed – version 1.1.14 - No new development
9. Nursey Phytosanitary Tracking State – under review
10. Nursey Phytosanitary Tracking Federal – under review
11. Aquatic Dealer Permit Tracking – Database and user interface completed
12. Plant Conservation Permit Request System Online – In testing
13. Plant Conservation Permit Inspection Tracking System Online – Under development
 - Plant Conservation Permit Inspection Reporting System Online – Under review
 - Added new content to the Plant Industry Website as requested by PID staff.

Maintenance

1. Training, maintenance and support performed on databases for the Seed Laboratory, Seed and Fertilizer Inspection, Plant Conservation, Gypsy Moth, Boll Weevil and Noxious Weed programs.
2. Support and maintenance of the old seed DOS based seed program
3. Worked with staff to update Plant Industry Website
4. Hardware and software reviews
5. Support staff on basic software application questions

Research and testing

1. Review of the Information Technology Infrastructure Library (ITIL®) adopted by the state of North Carolina.
2. VB.NET 2003 and 2005 for porting all application in current use.
3. C#.NET 2003 and 2005 for adding functionality to new applications.
4. MS SQL server 2000, 2003, 2005 for porting databases that will be used for information to be displayed on the web.
5. ASP.NET for displaying information on the Web and updating ASP 2.0 application
6. Project management applications, tools, and techniques to help with software development requirements of a particular project.
7. Crystal Reports 10.0 to offer reporting through applications developed in house.
8. Review of new Operating systems: Linux, Windows Vista aspects of information security.

Entomological Programs

Movement of Live Insects for Research or Commercial Purposes

NCDA&CS evaluated and approved federal applications for (PPQ Permit Number 526) to move live plant pests into North Carolina for 240 insect species, which includes several multiple entries. The large number applications to move plant pests into North Carolina reflects the continued market in commercial production, sale, and movement of butterflies for education, outdoor weddings, and other functions.

Boll Weevil Eradication Program

Cotton acreage for 2006 was 862,677 acres. Cotton was grown in 59 counties. There were 61,985 traps installed on 35,360 cotton fields. Trap installation began July 21, 2006, and trap removal was completed November 17, 2006. Twenty-one temporary employees were hired to assist with quality control and trapping.

Boll Weevil Capture

No boll weevils were captured during the 2006 cotton-growing season.

North Carolina Boll Weevil Assessment Information (As of December 1, 2006)

	2006	2005	2004
Number of Acres	862,677.0	807,032.31	722, 601.0
Number of Growers	2,791	2,714	2,818
Acre Assessment	\$3.25	\$3.50	\$3.50
Assessments Due	\$2,803,700.20	\$2,824,613.09	\$2,529,103.50

2006 Boll Weevil Trapping Summary			
COUNTY	ACRES	FIELDS TRAPPED	TRAPS SET
Anson	3702	130	236
Beaufort	26136	368	763
Bertie	40270	1395	2788
Bladen	9596	362	676
Cabarrus	603	29	46
Camden	958	28	61
Carteret	2527	80	158
Catawba	10	1	1
Chatham	0	0	0
Chowan	18493	573	1171

Cleveland	2268	138	194
Columbus	7403	370	590
Craven	16893	536	1063
Cumberland	11200	406	766
Davidson	804	24	54
Duplin	16173	641	1225
Edgecombe	52495	2275	3646
Franklin	217	25	26
Forsyth	23	9	9
Gaston	13	1	1
Gates	18273	572	1239
Greene	20689	854	1498
Halifax	69931	2311	4811
Harnett	14708	791	1187
Hertford	20215	688	1390
Hoke	16733	1017	1152
Hyde	21204	299	1391
Iredell	1085	38	75
Johnston	17989	1118	1565
Jones	27448	775	1768
Lee	393	43	48
Lenoir	34015	1254	2445
Lincoln	117	4	7
Martin	47962	2349	3680
Montgomery	1592	90	137
Moore	67	8	10
Nash	15369	615	1442
Northampton	63994	3745	5375
Onslow	7167	270	492
Pamlico	2445	109	216
Pasquotank	4858	111	304
Pender	6908	249	548
Perquimans	21787	578	1375
Pitt	33283	1426	2382
Richmond	3171	69	165
Robeson	31672	1341	2313
Rowan	682	32	51
Rutherford	289	13	22
Sampson	38564	2466	2980
Scotland	18458	840	1278
Stanly	13049	611	935
Stokes	84	13	14
Tyrrell	5239	51	289
Union	6057	204	401
Wake	142	27	28
Warren	2025	153	216

Washington	14758	441	1516
Wayne	25461	1017	1797
Wilson	24993	1376	1967
Yadkin	17	1	2
TOTALS	862677	35360	61985

Imported Fire Ant Survey and Monitoring Program

The Red Imported Fire Ant (RIFA) continued to spread into new areas in North Carolina in 2006. Surveys have been tabulated and an evaluation for the extension of the quarantined area has been completed. Revisions to the IFA quarantine are anticipated for the 2007 calendar year; however, those recommendations have not yet been published.

Four temporary employees worked to survey along the existing quarantine line in 43 counties. The table below summarizes the 2006 RIFA temporary employee survey efforts.

RIFA WORK COMPLETED IN 2006

Survey totals by county:

County	Miles Surveyed	Acres Surveyed	New Sites Included
Alamance	626	40	5
Avery	105	9	0
Bertie	555	145	9
Buncombe	2099	254	5
Burke	1578	186.5	3
Camden	165	35	0
Catawba	2030	222.5	7
Chatham	20	4	1
Cherokee	743	448	25
Clay	393	204	9
Currituck	645	184	3
Dare	154	10	
Davidson	2156	223	24
Davie	1290	186	1
Durham	225	20	4
Edgecombe	273	45	49
Forsyth	1250	125	5
Franklin	959	121	8
Gates	125	75	1
Graham	256	203	0
Granville	761	77	30
Guilford	576	61	0

Halifax	813	235	15
Harnett	5	10	1
Haywood	1014	158	2
Henderson	403	351	2
Hertford	240	105	0
Iredell	1083	126	32
Jackson	2253	530	1
Lincoln	1749	116.5	4
McDowell	1405	133	3
Macon	1321	809	14
Martin	80	20	2
Nash	584	30	3
North Hampton	60	30	3
Orange	345	65	6
Pasquotank	100	35	11
Perquimans	80	20	1
Randolph	1334	114	46
Rowan	1696	172	33
Rutherford	1964	142.5	17
Swain	1574	125	1
Transylvania	209	157	0
Total	35296	6362	386

Twenty-eight imported fire ant inspection blitzes were carried out at North Carolina weigh stations in support of the federal fire ant quarantine on movement of articles regulated by the quarantine. Additionally, there were seven potted media samples taken from nurseries under IFA quarantine compliance to determine if bifenthrin was properly incorporated. The pine straw compliance agreement format has been approved by USDA APHIS PPQ; therefore, all pine straw bale producers in North Carolina who want to ship pine straw out of the IFA quarantine are now under compliance. There were approximately 450 people educated on the IFA Program during five IFA presentations given throughout the state for various agricultural agencies. The IFA Quarantine Program responded to more than 175 calls and requests for information that came in from consumers during 2006.

Sweetpotato Weevil Trapping Program

In 2006, NCDA&CS' personnel continued the statewide comprehensive sweetpotato weevil trapping survey on all commercially grown sweetpotato fields. Traps containing the female sweetpotato weevil's pheromone were placed at the rate of one trap per ten acres with a minimum of two traps per field. Commercial sweetpotatoes were grown in 38 counties for a total of 38,629.50 acres. There were 9,282 traps placed in 3,845 fields. The traps in all the commercial production areas were negative for 2006.

Storage facilities continue to be monitored on a year-round basis with one trap placed in each section of the storage house and an additional trap stationed outside the principal entrance. Again, no sweetpotato weevils were captured during 2006.

2006 Blueberry Export Certification Program

The Canadian Food Inspection Agency requires that all fresh blueberries shipped to Canada come from growers who participate in a Blueberry Certification Program. The program consists of monitoring and control procedures for the blueberry maggot, *Rhagoletis mendax*. Forty-three North Carolina production areas were monitored (3,124.4 acres total representing 91 fields) throughout the harvesting and shipping period and were issued certification documents. No blueberry maggots were detected in any of the fresh market blueberries being shipped to Canada in 2006.

2006 Gypsy Moth Program

Slow the Spread and Eradication

In 2006, NCDA&CS' Plant Industry Division carried out an extensive survey and treatment program for Gypsy Moth. The program was divided into two separate areas, Slow the Spread and Eradication.

The 2006 Btk treatment season began on April 19th and ended on April 27th. A total of 19,142 acres in the eradication area and 1,163 acres in the Slow the Spread area received two applications of Foray 76B at 1/3 gallon per acre. An additional 986 acres received one application of Gypcheck on the Great Dismal Swamp National Wildlife Refuge at one gallon per acre. Kent Neise with Prime Air LLC, received the contract at a price of \$16.36 per acre for the Btk and \$5.83 per acre for the Gypcheck treatment. Two Air tractors and one Turbine Thrush aircraft were used. The daily production rate averaged 2,809 acres/hour with an efficiency rate of 2,977 acres per hour. The treatments took longer than expected due to weather and large distances between blocks.

The flake treatments began on June 6th and ended on June 9th. Pontiac Flying Service treated four blocks totaling 8,010 acres with one application of Disrupt II at six grams per acre. As usual, with North Carolina being the first state to treat with flakes, problems are generally encountered. Two of the three aircraft being used experienced problems with the pods and there was a delay in delivery of the flakes. After problems were addressed, the project ran smoothly.

2006 Treatment table

Block	County	Acres	Treatment	Rate	Program
Coinjock MD	Currituck	6,454	Disrupt II	6 g/acre	STS
Jarvisburg	Currituck	1,718	Disrupt II	6 g/acre	STS
Shiloh East	Camden	499	Disrupt II	6 g/acre	STS
Shiloh West	Camden	1,015	Disrupt II	6 g/acre	STS
Corapeake	Gates	989	Gypcheck	1 gallon/acre	STS
Yanceyville	Caswell	543	Foray 76B	1/3 gallon/acre	STS

Coinjock BT	Currituck	345	Foray 76B	1/3 gallon/acre	STS
Knotts Island South	Currituck	275	Foray 76B	1/3 gallon/acre	STS
Hedersonville	Henderson	718	Foray 76B	1/3 gallon/acre	Eradication
Peachtree	Clay	720	Foray 76B	1/3 gallon/acre	Eradication
Valdese	Burke	8,119	Foray 76B	1/3 gallon/acre	Eradication
Casar	Burke	9,535	Foray 76B	1/3 gallon/acre	Eradication

2006 Gypsy Moth Treatment County Locations



Gypsy Moth Trapping Program

The 2006 trapping program was divided into two different areas, Slow-the-Spread and Statewide. In the Slow-the-Spread area, traps were placed on a two-kilometer base grid with one-kilometer and 500-meter delimit grids in areas that had high catches or treatments in 2005. The Statewide traps were placed on a three-kilometer base grid with 500-meter grids in areas of concern. The Slow-the-Spread area was divided into 22 separate trapping bid units. Ten private contractors placed, inspected and pulled 7,554 traps at an average cost of \$27.58 per trap. NCFS placed traps in 30 counties in the Statewide Program. Seventeen temporary employees and 18 field specialists set traps in the remaining counties. A total of 18,776 traps were deployed in 2006 with 1,021 moths detected in 568 positive traps.

FIPS	County	Total Traps	STS	Statewide	Total Catch	Positive Traps
1	ALAMANCE	241	201	40	8	7
3	ALEXANDER	74	0	74	0	0
5	ALLEGHANY	124	102	22	60	44
7	ANSON	140	0	140	0	0
9	ASHE	57	0	57	11	9
011	AVERY	56	0	56	0	0

013	BEAUFORT	243	0	243	2	2
015	BERTIE	402	350	52	0	0
017	BLADEN	152		152	0	0
019	BRUNICK	235		235	1	1
021	BUNCOMBE	115		115	0	0
023	BURKE	678		678	6	4
025	CABARRUS	112		112	0	0
027	CALDWELL	141		141	27	15
029	CAMDEN	151	151	0	2	2
031	CARTERET	142		142	4	2
033	CASWELL	367	367	0	43	28
035	CATAWBA	123		123	5	4
037	CHATHAM	223		223	2	2
039	CHEROKEE	96		96	0	0
041	CHOWAN	119	119	0	0	0
043	CLAY	47		47	0	0
045	CLEVELAND	129		129	1	1
047	COLUMBUS	253		253	0	0
049	CRAVEN	185		185	0	0
051	CUMBERLAND	196		196	0	0
053	CURRITUCK	170	170	0	32	11
055	DARE	146	22	124	6	6
057	DAVIDSON	171		171	1	1
059	DAVIE	79		79	1	1
061	DUPLIN	237		237	0	0
063	DURHAM	191	191	0	7	6
065	EDGECOMBE	190	68	122	1	1
067	FORSYTH	194	121	73	23	10
069	FRANKLIN	323	323	0	6	5
071	GASTON	97		97	0	0
073	GATES	244	244	0	146	15
075	GRAHAM	53		53	0	0
077	GRANVILLE	613	613	0	86	31
079	GREENE	79		79	0	0
081	GUILFORD	368	313	55	17	12
083	HALIFAX	531	531	0	36	15
085	HARNETT	175		175	0	0
087	HAYWOOD	115		115	0	0
089	HENDERSON	138		138	1	1
091	HERTFORD	229	229	0	4	4
093	HOKE	71		71	0	0
095	HYDE	158		158	2	2
097	IREDELL	180		180	4	4

099	JACKSON	157		157	6	1
101	JOHNSTON	232		232	2	1
103	JONES	100		100	0	0
105	LEE	75		75	1	1
107	LENOIR	200		200	0	0
109	LINCOLN	90		90	1	1
113	MACON	88		88	0	0
115	MADISON	104		104	0	0
117	MARTIN	140	14	126	0	0
111	MCDOWELL	235		235	1	1
119	MECKLENBURG	157		157	1	1
121	MICHELL	50		50	0	0
123	MONTGOMERY	133		133	0	0
125	MOORE	205		205	4	3
127	NASH	280	208	72	2	2
129	NEW HANOVER	66		66	0	0
131	NORTHAMPTON	363	363	0	5	4
133	ONSLOW	165		165	5	3
135	ORANGE	258	258	0	4	4
137	PAMLICO	70		70	1	1
139	PASQUOTANK	154	154	0	2	2
141	PENDER	220		220	1	1
143	PERQUIMANS	175	175	0	2	2
145	PERSON	268	268	0	15	12
147	PITT	246		246	1	1
149	POLK	55		55	1	1
151	RANDOLPH	232		232	7	7
153	RICHMOND	166		166	2	1
155	ROBESON	270		270	0	0
157	ROCKINGHAM	563	563	0	54	39
159	ROWAN	146		146	0	0
161	RUTHERFORD	142		142	0	0
163	SAMPSON	281		281	2	2
165	SCOTLAND	78		78	0	0
167	STANLY	118		118	0	0
169	STOKES	319	319	0	123	94
171	SURRY	353	353	0	119	85
173	SWAIN	41		41	0	0
175	TRANSYLVANIA	75		75	0	0
177	TYRRELL	104		104	0	0
179	UNION	170		170	1	1
181	VANCE	206	185	21	9	6
183	WAKE	321	141	180	5	6

185	WARREN	465	406	0	59	11
187	WASHINGTON	115		115	1	1
189	WATAUGA	88		88	12	9
191	WAYNE	176		176	1	1
193	WILKES	213	11	202	25	16
195	WILSON	118	3	115	0	0
197	YADKIN	111	18	93	1	1
199	YANCEY	66		66	0	0
	TOTALS	18776	7554	11163	1021	568

Nursery Certification Program

Nursery Summary by Category:

	Category	Number of Nurseries	Acreage
•	Retail	127	677.6
•	Wholesale	230	5,779.3
•	Retail and Wholesale	991	10,473.7
•	Institutional*	65	75.7
•	Registered**	266	138.6
	Totals	1,679	17,144.9

Collected Plant Certificates Issued - 84

Number of Nursery Dealers - 2,132

Stop Sale / Rejection Notices Issued - 28

* Institutional nursery – A nursery owned or operated by any governmental agency.

** Registered nursery – Any nursery less than one acre in size that produces, but does not distribute or sell nursery stock outside the state.

Phytosanitary Certification Program

Phytosanitary Certificates are issued to a grower or broker to facilitate movement of an agricultural commodity to another state or to another country. State certificates are used for movement within the U.S. The federal certificates are required for movement to another country. The majority of the certificates were issued for lumber, tobacco, cotton, cotton seed, peanuts, and sweetpotato cuttings. The number of federal certificates was down from 2005. This was caused in part by a federal position being established in the western part of the state. This new position shared in the huge workload in that part of the state.

Summary of Certificates issued by Category:

<u>Category</u>	<u>Number Issued</u>
Federal	
Phytosanitary Certificate	1,571
Re-Issue Certificate	93
Re-Export Certificate	50
Processed Product Certificate	74
State Certificates	
Phytosanitary Certificates	261

Plant Conservation Program (PCP)**Grants & Agreements****Natural Heritage Trust Fund (NHTF)**

In 2006, the PCP obtained \$ 4, 463,424 for acquisition of Plant Conservation Preserves in North Carolina. The NHTF grants are as follows:

	Received
NC 73 Powerline Savanna	\$ 1,260,000
Hebron Road Plant Conservation Preserve	\$ 1,244,650
Williams tract – Eno River Diabase Sill	
Plant Conservation Preserve	\$ 115,000
Penny tract – Eno River Diabase Sill	
Plant Conservation Preserve	\$ 55,000
Stevens Trust tract – Eno River Diabase Sill	
Plant Conservation Preserve	\$ 253,600
Arlen Parks tract – Eno River Diabase Sill	
Plant Conservation Preserve	\$ 17,850
White Oak Mountain Plant Conservation Preserve	\$ 1,325,000
Hodges tract addition – Tater Hill	
Plant Conservation Preserve	\$ 192,324
Total	\$ 4,463,424

Old Oxford LL Plant Relocation Agreement

NCDA&CS signed an agreement with Old Oxford LLC (a private developer) to relocate certain rare plant materials. It was not possible to protect the original site where these species occur and they were certain to be destroyed. PCP got involved due to Durham County's provision to protect the area which was first identified in the Durham County Natural Areas inventory. Total Project Value \$ 10,000.

Diabase Sill Cooperative Agreement

NCDA&CS entered into a cooperative agreement with the Eno River Association to implement management activities on certain portions of the Eno River Diabase Sill Plant Conservation Preserve. This agreement was made possible by funding from an Environmental Enhancement Grant via the Attorney General's office.

Total Project Value \$ 33,900.

**North Carolina Department of Transportation (NCDOT) & NCDA&CS
Reimbursement Agreement**

NCDA&CS entered into a reimbursement agreement with NCDOT to help acquire or manage White Irisette (*Sisyrinchium dichotomum*) habitat in south-western North Carolina.

Total Project \$190,000.

**Traditional Section 6 Agreements
United States Fish and Wildlife Service (USFWS)**

Staff has worked on three separate "segments" of a continuing Federal Aid Program with the (USFWS).

Segment 20: Work on this project segment was completed during 2006 and final reports were submitted.

Projects included: Developing preliminary site management plans for mountain region Plant Conservation Preserves, Plant Species monitoring data review, Statewide site prioritization for land acquisition, Aquatic Plant species prioritization, Long-term conservation planning, Seed collection for community restoration, Smooth Coneflower Monitoring, Prescribed burning on PCP Preserves.

Total Project Value \$84,000.

Segment 21: Work on this project segment began in late 2006. PCP staff spent considerable time working out the project narratives with USFWS and working out financial details with both USFWS and NCDA&CS' staff. Projects identified in this Segment will be the focus of staff during the early months of 2007.

Projects Include: Statewide Rare Species Monitoring, Setting Rare Species and Site Priorities, Rare Plant Habitat Restoration and Management, and Rare Plant Outreach and Education.

Total Project Value \$84,922.

Segment 22: PCP staff spent considerable time developing the project proposal and financial aspects of this segment with USFWS and NCDA&CS' staff. This project phase should replace Segment 21 in early 2007.

Statewide Rare Species Monitoring, Setting Rare Plant Species & Site Protection Priorities, Rare Plant Outreach & Education, Rare Plant Habitat Restoration and Management, Development of Rare Plant Species and Habitat Management Plans, Regulatory Programs and Protected Plant Permits, and Major Equipment Purchase

**Conservation Program Agreements
Natural Resources Conservation Service (NRCS)**

The Program obtained two Wildlife Habitat Incentives Program (WHIP) grants in 2006. These grants will support land management efforts at Hog Branch Ponds and Pondberry Bay Plant Conservation Preserves.

Total Project Value: \$42,382.

Golden LEAF Foundation

NCDA&CS' staff met with Golden LEAF personnel to discuss a proposal to create a Medicinal Plant Outreach position. Additional materials were developed for this meeting demonstrating the economic impact of Ginseng in North Carolina (included under Ginseng/Regulatory Programs). This project was not funded.

Administrative Items

Program Capacity

Throughout 2006, the NCDA&CS' Plant Conservation Program continued to operate with a single full-time state supported position. Since the inception of the Program in 1979, there has been no change in this status. During 2006, the Program has received an unprecedented amount of additional support from other Plant Industry Division employees to implement some of the many and varied land management tasks that exist on Plant Conservation Preserves. In addition and with the continued support of Federal Aid (Section 6) funding, the Program was able to add an additional full-time, permanent position, bringing to two the number of positions supported by Federal Aid.

Personnel

Several personnel changes occurred during 2006. Marj Boyer, PCP's long time staff botanist, retired on December 1, 2005. Laura Gadd, who recently completed her M.S. in Botany at NCSU, joined the staff on April 1, 2006. She is responsible for reviewing and issuing protected plant permits, conducting the Ginseng Program, and work on rare plant monitoring projects. Daniel Bunce joined the Program's staff on June 28, 2006. His main responsibility is to implement land management and stewardship activities on the growing number of Plant Conservation Preserves across North Carolina. Robert Evans continues to serve as the Program Coordinator and Plant Ecologist. Andrew Walker, the Program's temporary employee left PCP to join the North Carolina Botanical Garden in 2006. The staff began looking to replace Mr. Walker with two to four new temporaries.

Friends of Plant Conservation Foundation

The newly formed Friends of Plant Conservation received critical support during 2006. The North Carolina Native Plant Society agreed to provide the funds to get the Foundation up and running. There is still the need to identify capable individuals who have interest and ability to work on the Foundation and establish a point of contact for interested parties.

Multi-Agency Partnership Projects

Greater Uwharrie Conservation Partnership (GUCP)

In 2006, this partnership was formally established with the Plant Conservation Program as one of the original members along with the North Carolina Department of Environment and Natural Resources (NCDENR), The Nature Conservancy (TNC) in North Carolina, North Carolina Wildlife Resources Commission (NCWRC), North Carolina Zoo, Environmental Defense, and the Land Trust for Central North Carolina. The mission of this group as outlined in the Memorandum of Understanding (MOU) is:

To work for the long-term conservation and enhancement of biological diversity and ecosystem sustainability throughout the Greater Uwharries landscape compatible with the land use, conservation and management objectives of the participating organizations and agencies.

Cape Fear Arch Conservation Collaborative

Planning for this partnership began in 2006, with PCP as one of the participating members. A Memorandum of Understanding (MOU) was finalized and submitted for all participants' signatures. The logo design and tagline were finalized, subcommittees were proposed, and goals were set for 2007 meetings.

Onslow Bight Fire Learning Network

In late 2006, PCP began participating in this ongoing Network. The mission of this multi-agency and organization partnership is to restore and maintain fire adapted ecosystems and processes within the Onslow Bight landscape by working to increase the capacity for and reduce obstacles to conducting prescribed burning. It is expected that this partnership will also be formalized by an MOU. Current partners include: Department of Defense (DOD), NCWRC, NCDENR, USFS, TNC, and NCDA&CS' Plant Industry Division

Penny's Bend Advisory Committee

Robert Evans continues to play an active role on this committee. The most recent meeting helped finalize the overall management plan for the natural area, as well as discuss issues of relevance to both Penny's Bend and the Eno River Diabase Sill Preserve.

Public Outreach Efforts

2006 NC State Fair Plant Conservation Exhibit

PCP again participated in the "Our Land, Our Legacy" special exhibit. This required a huge commitment of staff time to design and carry out. Nearly 99,000 people viewed the exhibit featuring PCP's conservation mission, as well as images of Preserves, rare plants species, and live native plants from around North Carolina. Over 5,000 people participated in a scavenger hunt which involved answering a question about the Venus Flytrap.

Website improvements

Program staff are currently changing the content of the program's website to be more streamlined and user-friendly. Gadd & Evans have been working on new content and organization for the PCP website (which has not been changed substantially for years). Among the planned changes is more information on the protected plant species, more images, habitat and Preserve information. This revision will also feature an online permitting request system (see Regulatory Section of this document).

Program Overview Report & Powerpoint

PCP staff prepared a full color briefing package for program outreach. This document has proven a useful communication tool for numerous audiences. Much of the material was also incorporated into a powerpoint that was used at the State Fair and should serve well for presentations to a wide variety of audiences.

Regulatory Programs

Protected Plant Status

In 2006, the Plant Conservation Program took action to formally list twenty (20) new protected plant species in North Carolina and upgrade the status of one previously listed species. These species are as follows:

New Status	Former Status	Scientific name	Common name
E	-	<i>Amphicarpum muehlenbergianum</i>	Florida goober grass, blue maidencane
E	-	<i>Canoparmelia amabilis</i>	Worthy shield lichen
E	-	<i>Dichanthelium caeruleum</i>	Blue witch grass
E	-	<i>Eriocaulon texense</i>	Texas hatpins
E	T	<i>Fimbristylis perpusilla</i>	Harper's fimbry
E	-	<i>Gaylussacia nana</i>	Confederate huckleberry
E	-	<i>Helianthemum nashii</i>	Florida scrub frostweed
E	-	<i>Helianthus floridanus</i>	Florida sunflower
T	-	<i>Hexastylis rhombiformis</i>	French Broad heartleaf
E	-	<i>Isoetes microvela</i>	A quillwort
E	-	<i>Lipocarpha</i> (Hemicarpha) <i>micrantha</i>	Small-flowered hemicarpha
E	-	<i>Paronychia herniarioides</i>	Michaux's whitlow-wort
E	-	<i>Rhynchospora odorata</i>	Fragrant beaksedge
T	-	<i>Rhynchospora pleiantha</i>	Coastal beaksedge
T	-	<i>Sarracenia minor</i>	Hooded pitcher plant
E	-	<i>Scirpus flaccidifolius</i>	Reclining bulrush
E	-	<i>Spigelia marilandica</i>	Pink root
E	-	<i>Tridens ambiguus</i>	Pinelands triodia
E	-	<i>Utricularia resupinata</i>	Northeastern bladderwort
E	-	<i>Warea cuneifolia</i>	Carolina pineland-cress
E	-	<i>Zephyranthes simpsonii</i>	Rain lily

Permits Issued

A variety of permit applications were reviewed and several issued during 2006. Permits issued included two "blanket collecting" permits to authorize the collection of voucher specimens for identification purposes and seed materials to be placed into permanent conservation collections, three "relocation" permits to authorize the movement of specific protected plants from area of impending destruction, six permits authorizing the propagation and sale of two protected species, and permits authorizing scientific research on six protected species. An additional 20 inquiries for permits were made late in the year, many of which will be processed in 2007.

Ginseng Harvest

The 2005-2006 season data for all North Carolina counties showed just over 3,000 pounds of ginseng harvested in the state. This is the lowest reported harvest in the last ten years of record keeping. This is the lowest harvest total for all counties except three, which for unknown

reasons, reported low harvests in 2001-2002 season. In most cases, these numbers represent a major decline and a substantial economic loss in the affected counties. Combining all data, the cumulative economic loss, based on harvest declines from 1996 – 2005 is over \$25,000,000.

Permit Application & Review Process

PCP staff along with the Plant Conservation Board made a number of strides toward clarifying and simplifying the permit application and review process during 2006. Initial designs for an online permitting system channeled each applicant into a specific user category that asked certain questions specific to that type of application. Experience demonstrated that many applicants misunderstood, misinterpreted, or omitted information that required contact from PCP staff to clarify. A revised design was developed to eliminate confusion or missing information by allowing applicants to simply submit a request for a permit with their basic contact information. This process was supported by the Board and is currently in development. It will allow a rapid permit request to be submitted, accompanied by an email notification to PCP staff, with a confirmation email (receipt) to the applicant. PCP will then respond within 15 business days to obtain the necessary information to evaluate the permit request. If the request is appropriate and all necessary information is obtained, PCP will then have 45 business days to issue the permit.

Plant Conservation Preserve Additions

NC 73 Powerline Plant Conservation Preserve

This new Preserve in Moore County was established during 2006 with the acquisition of 124 acres.

Harvest Field Plant Conservation Preserve

This new Preserve in Randolph County was established during 2006 with the acquisition of approximately 31 acres.

Eno River Diabase Sill Plant Conservation Preserve

This existing Preserve was expanded by approximately 120 acres during the calendar year.

Tater Hill Plant Conservation Preserve

This existing Preserve was expanded with the acquisition of two tracts (Hodges & Miller) adding a total of approximately 54 acres.

Big Pond Bay Plant Conservation Preserve

This new Preserve in Cumberland County was established during 2006 with the acquisition of approximately 54.25 acres.

Hebron Road Plant Conservation Preserve

29 acres of this new Preserve in Durham County were established during 2006.

Boiling Spring Lakes Plant Conservation Preserve

Approximately 166 acres were added to this Preserve in Brunswick County during 2006.

Management Planning & Management Activities

Equipment Procurement

The PCP Program has begun to slowly obtain major equipment needed to support land management efforts. Purchases included a large boom mower, a medium duty bush cutter, fire plows, and disks. The program still has significant equipment needs to accomplish some of the pressing needs on the Preserve system, but we appear to have developed the necessary funding to account for most of these purchases in 2007.

Denson's Creek Plant Conservation Preserve

The population of Schweinitz's sunflower at this Preserve was augmented with seeds collected last year from mother plants originally from the site.

Rocky Point Marl Forest Significant Natural Heritage Area

For the second year in a row, Plant Conservation staff has worked to protect the state endangered Nutmeg Hickory at the only site where it occurs in North Carolina by reducing competition from the Chinese Privet (*Ligustrum sinense*).

Tater Hill Plant Conservation Preserve

Extensive monitoring and consultation discussions pertaining to beaver activity on this Preserve occurred. PCP reviewed the on-the-ground situation several times and, based on input from other experts and agencies, has decided to allow the beavers to continue modifying the site, although eventual destruction of existing beaver dams and/or population control may still be necessary.

Pondberry Bay Plant Conservation Preserve

A preliminary management plan for the Preserve was developed which included prescribed burning across the Preserve, accompanied by approximately 2,336 meters of new firebreaks. A need for manual thinning and removal of encroaching loblolly pines and hardwoods was identified on approximately 343 acres, while approximately 378 acres of dense pine plantations were identified for thinning. Tree planting needs were identified on approximately 420 acres. Nearly 500 acres of the prescribed burning goal have been accomplished.

Hog Branch Ponds Plant Conservation Preserve

A prescribed burn was conducted on approximately 202 acres of the Preserve in late January. A 50 acre pine plantation was manually removed.

Boiling Spring Lakes Plant Conservation Preserve

PCP and TNC met to discuss prescribed fire priorities and management issues. Working together, we hope to burn approximately 300-500 acres in two units during 2007. In addition, we have contracted with NCDENR and TNC to burn approximately 1,500 acres on the Preserve in 2007 at a cost of nearly \$13,000. Most of this acreage will be aurally ignited by NCDENR.

Eno River Diabase Sill Plant Conservation Preserve

PCP staff installed fire lines and prescribed burns on four units, removed a significant quantity of debris from the preserve, and targeted four invasive species for removal during this period.

Scientific/Botanical Issues

Protected Plant Prioritization

Using Natural Heritage information on state-wide distribution, quality of known populations, and other factors, staff has begun to evaluate and rank the existing protected plant species to help the program set conservation priorities. Species experiencing severe declines, such as *Lysimachia fraseri* and *Aster (Symphyotrichum) georgianum*, are examples of preliminary priorities.

New Plant Records

Staff located at least ten new populations of listed and/or state tracked plant species in and around Plant Conservation Preserves in 2006. Examples include *Echinacea leavigata*, *Hexalectris spicata* and *Eupatorium godfreyanum* (Eno River Diabase Sill), *Amorpha Georgiana* var. *confusa* and *Dionaea muscipula* (Hog Branch Ponds), *Berberis canadensis* (Substation Road), and *Thermopsis mollis* (State Park land).

Monitoring

Detailed population monitoring efforts were conducted for several listed plant species in and around Plant Conservation Preserves and other important plant sites in 2006. These efforts included one of the probable recovery populations of *Helianthus schweinitzii* in North Carolina (Denson's Creek Plant Conservation Preserve in Montgomery County), as well as many of North Carolina's known *Echinacea leavigata* populations. Flowering data were especially encouraging for *Echinacea laevigata*, which indicated that numbers were up at nearly all managed sites, especially those with recent prescribed fires conducted by PCP and partners.

New Species Listing Methodology

PCP staff continued to evaluate and consider a more objective listing methodology. Some of the data we hope to explore for inclusion in the methodology require a relatively commonly available computer software package.

Plant Pathology Programs

The "Plant Pathology and Related Programs" section includes major activities involving the Plant Pathologist and Laboratory Research Specialist. Programs are grouped in order by SUDDEN OAK DEATH, EXPORT, IMPORT, LABORATORY, NURSERY, TOBACCO, VEGETABLE, and NEW ISSUES

SUDDEN OAK DEATH PROGRAM: Survey, regulatory, and service activities

General background and links to other information concerning Sudden Oak Death (SOD), caused by *Phytophthora ramorum* can be found on the Plant Protection Section website under "New Pest Alerts" (<http://www.ncagr.com/plantind/plant/disease/sod.html>). This disease is killing thousands of oak trees in California and limited numbers in Oregon, and movement of nursery plants that can harbor the disease is regulated by federal and state quarantines. Funding for the survey and regulatory activities was provided by USDA APHIS PPQ under a Cooperative Agreement. In addition to the field and lab personnel hours reported below, the Plant Pathologist worked over 450 hours on planning, overseeing, and

reporting activities related to this program. She also prepared a CAPS funding proposal for continuing nursery survey activities in 2007. Major activities in 2006 included the following:

- State personnel were trained to conduct surveys.
- High-risk nurseries and dealers were identified so that they could be included in the nursery survey. To accomplish this, extensive shipping records were examined.
- A laboratory was maintained to assay regulatory, survey, and homeowner samples. The Laboratory Research Specialist conducted ELISA tests on all submitted samples to screen for *Phytophthora* species. She extracted DNA from ELISA-positive samples and mailed it to the PPQ lab for PCR testing as well as conducted her own real-time PCR tests. She also cultured the fungus from ELISA-positive plant samples. She worked over 365 hours on these and related activities.
- An SOD survey of nurseries and nursery dealers was conducted by Field Specialists starting in late April and continuing through early July. Ninety (90) locations were surveyed. Around 197 samples were submitted to the lab. No SOD was detected at any of the locations. Field Specialists worked over 560 hours total on general survey activities.
- Trace-forward (TF) investigations were conducted. Trace-forward investigations involved tracking down plants shipped to North Carolina from nurseries in California where SOD was found based on lists provided by PPQ. North Carolina had two TFs in 2006. One involved six locations (all small retailers), and the other involved 80 locations (all big-box retailers). Thirty-four (34) and 140 samples, respectively, were submitted to the lab. No SOD was found at any of these locations. Field Specialists worked over 320 hours on TF activities.
- Re-surveys of "previously-confirmed" locations were conducted. Previously-confirmed (i.e., positive for SOD) locations must be re-surveyed for two additional years following eradication, according to PPQ protocol. North Carolina had nine positive locations in 2004. These were resurveyed in 2005 and again in 2006. Fifty-two (52) samples were submitted to the lab. No SOD was found at any location. Field Specialists worked over 75 hours on re-survey activities.

EXPORT: General Export Certification Support

Plants and plant products shipped from the U.S. into a foreign country must be accompanied by a phytosanitary certificate indicating inspections or other specific requirements have been met. Countries vary greatly in what they require for various types of commodities such that careful research and interpretation of requirements are needed for each request. Demands on Plant Protection personnel for evaluation and inspection activities have escalated in recent years. The Plant Pathologist received and answered numerous inquiries from Field Specialists as well as North Carolina USDA APHIS PPQ personnel regarding interpretation of certification requirements relating to plant pathogenic organisms and disease distribution information. She, along with the Laboratory Research Specialist, coordinated general sampling and inspection procedures for seeds and nematode certification. In addition, she researched and then developed or refined specific certification procedures for specific situations as needed (or made a determination that certification could not be reasonably accomplished). Many of these involved small and/or unique shipments. Some specific examples include: strawberry plants to the European Union, rice seed to Chile, nursery stock to Canada, tobacco seed to the Philippines, corn seed to Mexico, sweetpotatoes to Uganda, blackberry plants to the United Kingdom, soybean seed to Argentina and South Africa, and

blueberry plants to South Korea, Chile, and Argentina.

EXPORT: Tobacco Blue Mold Oospore Field Survey (for Tobacco Export to China)

In order for China to accept shipments of tobacco, a blue mold oospore field survey must be completed annually in areas where blue mold was reported that year. It is important that all States participate because of the way tobacco is mingled, stored and sold collectively. The Plant Pathologist was designated by USDA APHIS PPQ to plan, coordinate, and monitor the survey in North Carolina in 2006 as she had also done in 2001 through 2005. The North Carolina Cooperative Extension Service (NCCES) administration was contacted and again agreed to allow county extension personnel to collect samples from affected counties. When PPQ notified the States that it would stop paying for assays of samples in 2006, the Plant Pathologist contacted the various umbrella groups for burley and flue-cured tobacco to explain the situation and outline a coordinated plan indicating who would be willing to pay for the assays of samples from the various States. These groups included the Flue-Cured Tobacco Cooperative Stabilization Corporation, the Burley Tobacco Growers Cooperative, and the Burley Stabilization Corporation. Which group paid for what samples depended on the type of tobacco (burley or flue-cured) and the State of origin. For the survey itself, North Carolina used state-specific field survey procedures written by the Plant Pathologist that were based on those developed by PPQ. These were distributed to the NCCES offices via the NCSU Tobacco Pathology Specialists. In 2006, blue mold was limited in North Carolina and was reported late in the season in the burley (western) region. It was not reported in the flue-cured eastern counties. PPQ had indicated that samples from North Carolina as well as the other States participating in the survey should be sent to the Plant Pathogen Identification Laboratory at N. C. State University, Raleigh for testing. However, when this lab closed at the end of August, the NCSU Plant Disease and Insect Clinic assumed this role. The surveys completed in 2006 (as well as those in 2001 through 2005) were negative for oospores in samples from North Carolina as well as from all other states.

In October, a Chinese buying delegation came to North Carolina to visit warehouses and other tobacco-holding facilities to tour, observe, and collect samples on which to base purchasing decisions. The Laboratory Research Specialist equipped and staffed the division's greenhouse annex laboratory for their use in assaying samples for blue mold oospores as had been done in past years and at their request. However, after assurances from the NCSU technical advisor, who helped staff the lab, that blue mold was not detected in the flue-cured region in 2006, the Chinese delegation decided not to test any samples this year. However, they did close visual inspections of representative samples of each lot purchased. [Note: They purchased around 8,000 tons of flue-cured tobacco from five tobacco companies valued at approximately \$55 million during this buying trip.]

In early December, the Plant Pathologist and Division Director attended a meeting of industry, NCSU, and PPQ personnel to discuss the termination of the NCSU Blue Mold Forecasting System and how this might impact tobacco exports to China in the future. The forecasting system is the official record of the distribution of blue mold in any State in any given year. Without it, there might not be a harmonized approach for targeting counties to sample. The ultimate fate of the forecasting system was still in question at the time of this report.

EXPORT: Special procedures for shipping white potatoes into Canada

Below-ground portions of any plant grown in SCN-infested areas cannot ordinarily be certified for shipment into Canada unless extensive surveys are done. However, Canada will allow importation if done under a ministerial exception and if certified as to soil cleanliness. Although personnel in the NCDA&CS Marketing Division are the primary contacts for export under ministerial exemptions, the operational protocol is updated yearly by the Plant Pathologist after consultation with CFIA, USDA APHIS PPQ, and the other States involved (VA, MD, and NJ). This protocol includes an emergency exemption and procedure to follow in the event that wet weather and wet soil conditions throughout the harvesting area result in potatoes failing to meet the grade standard for soil cleanliness. Were that to happen, Field Specialists would then become more directly involved in the emergency certification process. The emergency exemption was not needed in 2006. The Marketing Division reported that around 614 bulk loads of potatoes and 66 loads in bags were shipped from North Carolina to Canada under ministerial exemptions in 2006.

EXPORT: Nematode Certification

Because of soybean cyst nematode concerns, Canada requires special certification of plants with roots or below-ground parts (such as bulbs) from North Carolina regardless of whether or not there is soil present on the plant material. Similarly, California and Arizona have reniform and burrowing nematodes certification requirements. In 2006, forty-nine (49) North Carolina nurseries were soil-surveyed on a minimum 25x25' grid (or the shipment itself was intensively sampled) in order to certify plants for shipment into California, Arizona, and/or Canada. Field Specialists collected the soil samples and submitted them to the Nematode Advisory Service (NCDA&CS Agronomic Division) for assay. Procedures for sampling and submission of samples are updated and maintained by the Plant Pathologist, but this role will be assumed by the Laboratory Research Specialist in 2007. The Field Supervisor receives written results from the lab, interacts directly with field personnel, and maintains records of the surveys.

IMPORT: Movement of Plant Pathogens for Research and Other Purposes

Federal PPQ Form 526 ("Application and Permit to Move Live Plant Pests or Noxious Weeds") allows the movement of plant pathogens and other pests into North Carolina from other states or countries for the purpose of conducting research, diagnostic identifications, or industrial or other commercial applications. USDA APHIS PPQ receives the applications initially, evaluates them, adds conditions, and forwards draft permits to the Plant Pathologist for further evaluation and approval. Because all plant pathogenic organisms are regulated, the pest-risk of each organism must be evaluated to ensure that adequate safeguards are listed in the conditions of the permits. Forty-seven (47) applications for new permits or amendments to existing permits were evaluated by the Plant Pathologist in 2006, with a large percentage requiring her to make comments or acquire additional information from PPQ or from the applicant directly before approval could be given. These included a total of ~84 fungi, ~92 bacteria and actinomycetes, ~8 viruses, and ~7 nematodes. Three (3) permits were more general, involving imported soil from which bacteria would then be isolated. Five (5) others were open-ended to receive non-specified or unknown organisms for identification and other purposes. These latter types of permits, as well as those for higher-risk organisms,

require lab inspections prior to issuance; these are conducted cooperatively between PPQ and NCDA&CS personnel. PPQ moved towards the establishment of an electronic "E-permit" system in late Fall 2005. Twenty-four (24) of the 47 applications were of this type in 2006. There is an ongoing cooperative effort between the Plant Pathologist and faculty at N. C. State University to maintain and update lists of "widely prevalent" plant viruses, fungi, and bacteria in joint projects with related American Phytopathological Society committees and USDA APHIS PPQ. Such lists are intended to help to expedite the processing of applications. These lists were reviewed and updated in 2006 by the Plant Pathologist.

IMPORT: Imported Plants and the Post-Entry Quarantine (PEQ) Program

The federal Post-Entry Quarantine Program, conducted cooperatively between USDA APHIS PPQ and State plant pest regulatory officials, enables individuals or companies to import from outside the U.S. plant material that may pose a plant pest risk. Plants must be kept under quarantine for two growing seasons and be inspected for pests of quarantine significance (primarily diseases) before the importer is allowed to move, use, or sell them without restriction. The program also involves conducting pre-importation, site-screening inspections. There were approximately 6474 plants (in 15 separate shipments) under post-entry quarantine at some time in 2006. The great majority (>89% of the total number of plants) consisted of ~5781 maples in two shipments. Eight other shipments had less than 20 plants per shipment but still required the same number of inspection visits. Responsibilities for the PEQ program were transferred to the Laboratory Research Specialist in 2006. In addition to making field assignments and answering Field Specialists' questions, she, along with the Plant Pathologist, addressed questions from nurseries and individuals wishing to import plants, referring them when necessary to the appropriate PPQ office to assist in obtaining the necessary import permits and other documentation. In July, the PPQ PEQ Program Manager from Beltsville, Maryland traveled to Raleigh to provide updated PEQ training to PPQ and NCDA&CS personnel, including the four Field Specialists that currently have PEQ assignments, the Laboratory Research Specialist, the Field Supervisor, and the Plant Pathologist. It became more apparent that plant shipments are slipping through the ports without the required inspection and documentation (we hear about these from the importers themselves, not from PPQ notices). PPQ is notified and remedial actions are taken when this occurs.

IMPORT: Detection of Golden Nematode in Quebec, Canada, and its effect on movement of strawberry plants into the U.S.

Golden nematode (*Globodera rostochiensis*), a nematode of quarantine significance, was detected in Quebec, Canada in late summer. It has been found historically in the U.S. only in isolated areas of New York, where infested areas are regulated. As a result, USDA APHIS PPQ prohibited movement of plants with below-ground parts into the U.S. from Quebec pending completion of adequate surveys to delimit its distribution there. The Plant Pathologist, upon consultation with various NCSU personnel, prepared an assessment report for USDA APHIS PPQ outlining what impact this might have on North Carolina strawberry growers. [It turned out only a few growers had planned to get plants from Quebec; almost all of North Carolina's Canadian sources are in Ontario and Prince Edward Island, which are not GN-regulated areas.] NCSU personnel, reacting to this news, sent an alert out to all berry growers to warn that their plant sources could be cut off and they should make alternative

plans. Other States were more severely-impacted because of the high number of plants expected from Quebec during the height of the planting season. PPQ reacted by developing a special certification procedure to allow continued plant movement during this critical time period. The Plant Pathologist also participated in several conference calls to ensure that news of any additional unexpected limits on plant sources would be quickly relayed to potential North Carolina plant importers.

LABORATORY: Sudden Oak Death sample testing

Activities related to Sudden Oak Death testing are reported under the "Sudden Oak Death" program section. The Research Laboratory Specialist conducted ELISA screening on all samples collected as part of the Sudden Oak Death survey and regulatory program in 2006. She conducted real-time PCR on all ELISA-positive samples and sent extracted DNA to the PPQ lab for confirmation. She also increased her ability to identify *Phytophthora* species recovered from ELISA-positive samples via culturing.

LABORATORY: Tall Fescue Endophyte Testing Program

The NCDA&CS' Tall Fescue Endophyte Testing Program continued to accept samples from both in-state and out-of-state sources. Many other testing labs, including some of those connected with universities, have discontinued their testing services. Ours is now one of the few that still accepts samples. The Division web page describing this service has garnered a great deal of attention in internet searches for fescue problems, resulting in questions, if not samples, on a weekly basis. In 2006, the laboratory processed a total of 58 endophyte samples. Forty-three (43) of those samples were pasture samples; fifteen (15) were seed samples. Of the 15 seed samples, nine (9) were official samples for the Division's Seed Testing Laboratory, and six (6) were service samples or samples sent in for testing by the public. This increase in publicly-submitted seed samples is new and a direct result of information provided on the Division web page. Also, one grow-out test was performed to verify the viability of any endophyte fungus that might be present in the seed. This test was performed for the USDA ARS in Oklahoma. They also found the service via the internet.

LABORATORY: Fertilizer bioassays

In 2006, the Plant Pathology Laboratory tested 115 fertilizer bioassay samples. This program is designed to spot-test tobacco fertilizer samples for possible herbicide contamination. Sample numbers were down from last year due to excessive hold-over in bulk fertilizer components from the 2005 growing season. The Laboratory Research Specialist installed an automated watering system for this program to assure that all test plants were watered equally and in a timely manner instead of relying on hand-watering procedures as in past years. For more details, see the full text in the Fertilizer Section of the Division annual report.

LABORATORY: Soybean Cyst Nematode Real-time PCR Testing

The Laboratory Research Specialist located by means of literature searches a research paper published by Kris Lambert (University of Illinois) describing a real-time PCR procedure that could be used to identify soybean cyst nematode (SCN). Upon further intensive study and

personal communications with Dr. Lambert, she adapted it for use in support of the nematode export certification program. As part of the SCN certification procedure for shipping plants to Canada, soil must be collected by the certifying Field Specialist from plants or from the nursery grounds. The soil must then be assayed by the NCDA&CS Agronomic Division's Nematode Assay Service and found to be free of SCN cysts before a phytosanitary certificate can be issued. Sometimes, cyst bodies are found in these soil samples. Although some non-regulated cyst species are known to occur in North Carolina, cysts of these non-regulated species cannot normally be differentiated from those of SCN based on morphology, especially if the cysts are not fresh. Therefore, recovery of any cyst was usually grounds for denying certification. This real-time PCR procedure has proven to be very specific in identifying SCN cysts and has been successfully-tested against several closely-related species. Future plans are to locate and include in the procedure a universal control to detect DNA from any species of nematode to ensure some type of nematode DNA is present in the sample. This would ensure the sample was not inadvertently lost in the preparation process and would strengthen the validity of the test. In 2006, cysts found in two (2) soil samples tested PCR-negative for SCN (while the known SCN control tested positive). The associated shipments were certified based on these SCN-negative results.

LABORATORY: Construction of Greenhouse Watering System for the Seed Section

The Laboratory Research Specialist designed and installed an automated watering system in the Seed Section's house of the Division's greenhouse on Blue Ridge Road to facilitate the testing of germination factors for seed samples. This system will take the place of a testing system previously housed in the basement of the Old Health Building before the space was lost due to construction related to elevator improvements. This timed, misting system provides an adequate moisture/temperature environment for sand tests on corn seedlings.

LABORATORY: Participation in a National Mock Bioterrorist Attack Scenario

At the request of USDA APHIS PPQ CPHST, the Plant Pathologist and Laboratory Research Specialist participated in survey of diagnostic labs to determine the lab capacity for assaying plant samples in the event that *Phytophthora ramorum* (causal agent of Sudden Oak Death) or *P. kernoviae* was introduced into the Great Smokey Mountain National Park as part of a terrorist attack. The number of samples that could be processed via ELISA and real-time PCR tests was determined based on assumptions pertaining to existing capacity, temporary surge capacity, and sustained response capacity.

LABORATORY: Computer Support for New Seed Section Database System

The Laboratory Research Specialist cooperated in assisting the Division's Applications Analyst Programmer with beta-testing and trouble-shooting the new Seed Section database system currently under development by the programmer. Testing has been both intensive and extensive, requiring someone with programming skills to help identify specific problem areas. This system is being rewritten to accommodate advances in technology and the growing needs of the laboratory. In order to serve all sample submitters, the system has come to require additional features and more functionality, resulting in database expansion and an increase in complexity. Her involvement with this testing is expected to continue in 2007.

NURSERY: Diagnosis of Problem Plant Samples

Plant Protection Specialists and other Section personnel collected ~32 problem plant samples from nurseries during their nursery inspection visits and submitted them to the NCSU Plant Disease and Insect Clinic (Raleigh) for diagnosis. The Plant Industry Division does not maintain a lab for general diagnostic purposes. These samples were assayed by the Clinic as a courtesy under a voucher system. The Plant Pathologist provides operational procedures for the submission of these samples and serves as the liaison between the Specialists and the Clinic, assisting with interpretation of diagnoses and recommendations when necessary. Some of the more common problems included scale insects, various dieback and root rot fungi, strawberry anthracnose, and daylily rust (which resulted in stop-sales at several retail locations), as well as cultural problems. Some of the more unusual problems that required additional input and evaluation included potato scab, leyland cypress needle blight, a canna virus, hosta virus X, coleus downy mildew (new detection in North Carolina), and canna rust (also a new detection in North Carolina, on plants from another State). The Plant Pathologist also responded to numerous homeowner requests for diagnosis of plant diseases. These are often then referred to the NCCES in their respective counties.

NURSERY: Strawberry Plant Inspections

Strawberry plants are defined as general nursery stock under the nursery certification regulation, and specific standards are not stated. However, due to the threat of anthracnose disease, special operational procedures are followed during the annual inspection (i.e., timing of inspections, more intensive inspection rates, and required removal of symptomatic plants). Although plants with anthracnose must be removed from the field prior to harvest so that remaining plants are “apparently free” of the disease, remaining plants may still be infected without showing symptoms. On the other hand, the N. C. Crop Improvement Association (NCCIA) strawberry plant certification program has a zero field tolerance for anthracnose. It also has requirements for plant source, sanitation, and field isolation, all of which minimize the chances for anthracnose development. NCCIA is responsible for conducting inspections of its own certified nurseries under a memorandum of understanding with NCDA&CS although the nurseries must still be licensed by NCDA&CS. The Plant Pathologist coordinated inspection activities between the two agencies to ensure plants were inspected by one or the other and to prevent overlap of inspections. She also participated in a workshop held in November for NCCIA-certified nurseries to discuss common problems and future plans. Ten (10) strawberry nurseries grew approximately 175 acres of plants in North Carolina in 2006.

TOBACCO: Plant Importation and Certification Inspections

The Tobacco Plant Certification regulation requires anyone who moves tobacco plants into North Carolina from another state to do so under an import permit system. Every year, the previous five years’ importers are sent reminder letters. There were no import permit applications received in 2006. Although the import permit program was at one time extensive, most North Carolina tobacco growers today grow their own plants in greenhouses or obtain them from other growers locally. [Traditional plant beds have essentially become obsolete in the flue-cured area.] Also, under the regulation, plants grown in North Carolina and sold for planting in a location more than 75 miles away from the place of production

must be inspected and certified. Such growers require weekly inspections during the shipping season and the issuance of a certificate to provide proof of inspection. A major reason for this requirement is the possibility of moving blue-mold infected plants from one growing region into another, starting an epidemic prematurely. There was only one North Carolina-certified greenhouse tobacco plant grower in 2006 (~two million plants) that shipped beyond 75 miles. No disease problems were reported. An increasing number of growers are beginning to grow burley tobacco in non-traditional regions (i.e., North Carolina piedmont, coastal plain, and sandhills areas). Burley varieties are more susceptible to blue mold than flue-cured varieties. For now, it appears that burley tobacco transplants for planting this new acreage are self-produced in the local area and will not require certification.

VEGETABLES: Plant Importation and Certification Inspections

The Vegetable Plant Certification regulation requires certification and weekly inspections of any vegetable plants grown in North Carolina for sale to commercial growers. There were no certified vegetable plant nurseries in 2006 except for those under the N.C. Crop Improvement Association/NCSU Micro-Propagation Unit certification program for sweetpotato cuttings/seed producers. The NCCIA/MPU program meets or exceeds the requirements of the regulation, so NCDA&CS personnel are not required to conduct inspections. The regulation also requires that any plants or seed potatoes entering North Carolina be certified and meet certain disease standards. Field Specialists did not document any vegetable plant inspections at dealer locations or any seed potato spot-checks at end-user locations, but no complaints were received.

VEGETABLES: State/National Harmonization Program for Seed Potato Certification

For the past several years, the potato industry has been working with federal and state regulators on a strategy to establish minimum standards for certification of seed potatoes in order to facilitate interstate shipment and export to foreign countries. It would enhance uniformity and quality of commercial potatoes as well. The centerpiece of this effort has been the development of a memorandum of understanding (MOU) to be signed by the USDA APHIS PPQ and State governments to establish these standards and promote compliance with pest management plans. In August, the final version of the MOU was presented to the States for implementation. The Plant Pathologist throughout the development process participated in conference calls, evaluated proposed versions of the MOU, posed questions to PPQ asking for clarification as to what impacts signing the MOU could have on the North Carolina potato growers and their seed sources, and prepared the assessment. As a result of this and lingering questions, NCDA&CS decided not to sign the MOU at this time. North Carolina does not have a seed industry. Growers produce commercial potatoes for processing and tablestock use only. It remains unclear as to what impact signing the MOU would have on their choice of seed sources (i.e., signing it would technically limit their sources to only those that are also MOU signatories). The Canadian seed-source issue was not specifically addressed, and many North Carolina growers obtain seed potatoes from Canada. North Carolina will wait for these and other issues to be clarified before reconsidering.

NEW ISSUES: Potato Cyst Nematode detection in Idaho

Potato Cyst Nematode (*Globodera pallida*) was found for the first time in the U.S. in Idaho in April in a routine soil survey sample. This nematode is of significant quarantine significance and can severely reduce the yield of potatoes. Federal and State regulatory actions were immediately taken to limit the spread from the known area in Idaho and to delimit the distribution area. The Plant Pathologist participated in numerous conference calls involving this issue and its possible impact on North Carolina. When PPQ announced a national PCN survey would be funded, she evaluated drafts of the survey protocol for feasibility, pointed out unclear directions, prepared a financial plan, met with lab personnel to outline routing/assay/reporting procedures, and interacted with North Carolina marketing and industry representatives to gauge their interest and concerns in participating in this voluntary survey. Due to the perceived high cost/benefit ratio (i.e., high regulatory consequences if the nematode were to be found during the survey) to the specific grower as well as to the entire production region, the general consensus among the North Carolina Potato Association Board members was for North Carolina to delay until early 2007 its decision whether or not to participate in the national survey. (The timeframe for completion of the national survey is two years.) North Carolina does not have a seed industry. If PCN were found in North Carolina, it might indicate that seed sources had been contaminated at some point and the nematode had been generally distributed to many other States as well. If wide-distribution was verified as more States completed their surveys, PPQ might then switch from an "eradication" program to a "management" program. However, until then, a positive detection in North Carolina could result in extensive regulatory actions.

Regulatory Weed Program

Noxious Weeds

The objectives for the noxious weed component include:

- Eradicate, where possible, manageable infestations of noxious weeds in the state.
- Contain and reduce all known populations of noxious weeds in the state.
- Characterize spread and location of naturalized *Salvinia molesta* and tropical spiderwort (*Commelina benghalensis*) with intensive detection and delimiting surveys.
- Increase public awareness of *Salvinia molesta* and tropical spiderwort (*Commelina benghalensis*) through outreach activities with water managers, wildlife officers, and licensed aquatic applicators, extension agents and professional crop associations.
- Verify current distribution and population size of Tropical Soda Apple and contain with control measures where found.
- Consider for regulation through the NC Exotic Plant Pest Council (EPPC) invasive weed introductions that would require noxious weed status

To meet the objectives for noxious aquatic weeds, aquatic plant dealers throughout North Carolina continue to be inspected for the presence of prohibited noxious weeds. No noxious aquatic weeds were reported in 2006. During the reporting period, the 30-acre wetland site near Burgaw, Pender County, where Giant Salvinia was first detected in 2000 was thoroughly surveyed and the boundaries of this infestation were found to have remained stable since 2004, but the potential for spread has been increased with flooding at the site from Hurricane Ernesto and a winter "noreaster" storm in November. The infestation appears not to have spread

downstream from the site but surveys are scheduled to verify if plants have escaped into the Cape Fear River system.

Agency personnel participated in the Northeast Cape Fear Giant Salvinia Task Force, which was organized in 2002. Additional sites in Craven, Onslow, and New Hanover Counties were monitored and the Cape Golf Course ponds continue to be monitored by the Giant Salvinia Task Force. Further detection and delimiting surveys will be conducted throughout eastern North Carolina in 2007.

Surveys for the Federal Noxious Weed, Tropical Spiderwort, continued at the Cherry Research Farm, Wayne County, North Carolina and at the Tidewater Research Station in Washington County, North Carolina. The weed is being controlled on most fields treated by fumigation with methyl bromide, but some spread has reoccurred in three fields that were previously infested. Tropical spiderwort was not found in surveys at Sampson county sites and at the NCSU field horticultural lab. The Tropical Spiderwort Advisory Committee is active and meets on a regular basis to provide input. The 2007 plan for both eradication and regulation will be compiled prior to end of January.

Purple Loosestrife survey and eradication continued in Alleghany, Davidson, Forsyth, Mitchell, Onslow and Watauga Counties.

Visual surveys for Mile-a-Minute weed, oriental bittersweet and Orabanche were conducted in 21 western North Carolina counties (See Table 1). No infestation of any of these species was found.

No puncturevine was found during survey in Chowan County in 2006.

Tropical Soda Apple (TSA) continues to occur at Martin's Abattoir and Wholesale Meats in northern Sampson County. At this site, TSA contaminated rumen contents and manure from the cattle slaughtering process are spread on nearby fields, resulting in dissemination of the weed. The infestation persists at a low level, apparently due to repeated re-introductions of TSA seed in cattle shipped to the location for slaughter. A second site, with detections in 1998 on Coharie Farms pastureland in southern Sampson County, also continues to be surveyed. More than 2,000 acres were surveyed at these sites at least once during the reporting period. No TSA or Tropical Spiderwort were found. Other locations throughout North Carolina known to have recently received cattle from Florida were surveyed with negative results (See Table 1). Survey and eradication efforts at both Sampson County sites where TSA has been found will continue in 2007.

Regulatory Weed Program

The purpose of the Regulatory Weed Program is to implement the State Noxious Weed Rules and the Aquatic Weed Control Act of 1991 through the enforcement of quarantines designed to prevent the establishment and spread of noxious weeds.

Permits or certificates are required to move regulated articles from regulated states into North Carolina and from a regulated area in North Carolina to a non-regulated area in the State. There were 19 NCDA&CS PPS-1 (Application and Scientific Permit to Move Plant Pests or

Regulated Articles) permits issued covering research and training purposes for 12 species of weeds, outside of the “blanket permit” covering all noxious weeds for the Plant Pest Inspectors. There were 113 State Phytosanitary Certificates issued by NCDA&CS’ Plant Pest Inspectors (witchweed project) for the movement of regulated articles from quarantined counties. The staff Weed Specialist evaluated and approved two Federal permit applications to move Federal Noxious Weeds into North Carolina for research or commercial purposes. Several letters were sent regarding individual queries concerning pest quarantine boundaries and verification of regulatory status.

To maintain technical vitality in the noxious weed program the Staff Weed Specialist participated in the North Carolina and Southern Weed Science Societies, the North Carolina Vegetation Management Association, the Aquatic Ecosystem Restoration Foundation and the Society of American Foresters. Close interaction, cooperation and networking is also being accomplished among personnel at NCDENR, North Carolina State University and the Agricultural Industry Research Departments. The NCDA&CS’ Regulatory Weed Program was officially represented in meetings with USDA APHIS, North Carolina-Exotic Pest Plant Council, the Northeast Cape Fear Giant Salvinia Task Force, and the North Carolina Aquatic Weed Control Council. Program guidelines and information, including slides, brochures, and responses, were provided upon request to agency personnel and the general public.

Aquatic Plant Dealer Program

The Plant Industry Division is responsible for field implementation of the Aquatic Weed Control Act of 1991. This Law and accompanying rules restrict the importation, sale, use, culture, collection, transportation, and distribution of noxious aquatic weeds. All in-state aquatic plant dealers are requested to register with NCDA&CS to facilitate the plant inspection program. There were over 300 aquatic dealers registered. Aquatic dealerships were inspected throughout the year. No aquatic noxious weed detections were reported at aquatic plant dealers in 2006.

Witchweed Program

The Federal Noxious Weed, Witchweed (*Striga asiatica*), a selective parasitic weed, was first detected in North Carolina in 1956. A USDA Program was launched in 1957 to isolate and eradicate the weed pest. The NCDA&CS assumed responsibility for the Witchweed eradication project in October, 1995.

Originally, 357,217 acres in North Carolina were infested with Witchweed. Progress in the eradication program has reduced the infested area (i.e. fields which have accumulated less than five points and are still assumed to be infested) to 2,852 acres. In 2006, a cumulative total of 5,122 acres were treated in the eradication effort (some fields may have received more than one treatment in a given year). Of this acreage, NCDA&CS fumigated 73 acres with Methyl Bromide. Roundup was used to treat 1,600 acres and 978 acres were treated with ethylene gas to stimulate “suicide” germination. In aggregate, 65,313 acres were surveyed and monitored during the season to evaluate treatment efficacy, status of previously released fields and verify absence of witchweed surrounding current quarantine farms.

The NCDA&CS' Weed Regulatory Program maintained and updated all Witchweed data submitted from field staff in North and South Carolina.

Noxious Weed Survey Summary

Table 1. Targeted noxious weeds by county. The "X" corresponding to each county and weed indicates where surveys were done ("Surv." Column) and where the weed was detected ("Det." Column).

County	Purple Loosestrife		Mile-minute		Oriental Bittersweet		Orobanch		Tropical Soda Apple	
	Surv.	Det.	Surv.	Det.	Surv.	Det.	Surv.	Det.	Surv.	Det.
005 Alleghany	X		X		X		X		X	
009 Ashe	X		X		X		X		X	
011 Avery	X		X		X	X			X	
023 Burke	X		X		X		X		X	
027 Caldwell	X		X		X	X	X		X	
031 Carteret	X									
035 Catawba	X		X		X		X		X	
039 Cherokee									X	
045 Cleveland	X		X		X		X		X	
057 Davidson	X	X								
067 Forsyth	X	X	X		X		X		X	
059 Davie	X		X		X		X		X	
087 Haywood	X		X		X		X		X	
099 Jackson									X	
111 McDowell	X		X		X		X			
113 Macon									X	
115 Madison	X		X		X	X	X		X	
121 Mitchell	X	X	X		X	X			X	
133 Onslow	X	X								
147 Pitt	X									
149 Polk	X		X		X		X		X	
163 Sampson									X	X
161 Rutherford	X	X	X		X		X		X	
165 Scotland										
167 Stanly						X				
169 Stokes	X		X		X	X	X		X	
171 Surry	X		X		X	X	X		X	
187 Washington	X									
189 Watauga	X	X	X		X		X		X	
191 Wayne	X									

County	Purple Loosestrife	Mile-minute	Oriental Bittersweet		Orobanche		Tropical Soda Apple	
	Surv. Det.		Surv.	Det.	Surv.	Det.	Surv.	Det.
193 Wilkes	X	X	X	X	X		X	
197 Yadkin	X	X	X		X		X	
199 Yancey	X	X	X	X			X	

ADDITIONAL WEEDS:

County	Puncturevine	G. Salvinia		Tropical Spiderwort	
	Surv. Det.	Surv.	Det.	Surv.	Det.
041 Chowan	X				
049 Craven		X			
065 Edgecombe				X	
079 Greene		X		X	
107 Lenoir				X	
133 Onslow		X			
147 Pitt		X			
151 Randolph		X	X		
163 Sampson				X	
179 Union				X	
191 Wayne		X		X	X
183 Wake				X	
187 Washington				X	
195 Wilson		X		X	

Western North Carolina Survey and Control Project: Purple Loosestrife, Mile-a-Minute Weed, Oriental Bittersweet, Orobanche and Tropical Soda Apple Survey

- Nine plants of purple loosestrife were found in Mitchell County near Spruce Pine and subsequently controlled with herbicide. Three plants in Watauga County on highway 105 near Boone were found and treated with herbicide. Approximately 70 plants at Bass Lake on the Blue Ridge Parkway were treated with herbicide. The one loosestrife plant found last year at the Roaring Gap Golf Club was purportedly removed and incinerated.
- There were no detections of Mile-a-Minute weed in the Western counties that were surveyed (See Table 1).
- Oriental Bittersweet was found in the town of Rutherfordton. All other new infestations were found in counties where Oriental Bittersweet was originally found. New sites in Caldwell County show that bittersweet is well established in this county.
- The Orobanche surveys did not show infestations this year in spite of an explosion of Orobanche that was observed at previously infested sites in 2005.

- There were no detections of Tropical Soda Apple in the Western counties that were surveyed (See Table 1).

Purple Loosestrife Project – Other than Western North Carolina Counties

Purple Loosestrife (*Lythrum salicaria*) is a Class B State Noxious Weed. Because of its attractive flowers it has been planted as an ornamental, but it has proven to be an aggressive invader of wetlands, where it displaces native species and destroys wildlife habitat. Survey and eradication efforts, where needed, continued with Purple Loosestrife in Alleghany, Davidson, Forsyth, Mitchell, Onslow and Watauga Counties in 2006.

Tropical Soda Apple – Other than Western North Carolina Counties

Surveys continued at sites where the Federal Noxious Weed, Tropical Soda Apple (*Solanum viarum*), was first detected in 1995 (Martin's Abattoir and Wholesale Meats near Godwin, in northern Sampson County) and in 1998 (Coharie Farms in southwestern Sampson County). Two surveys were conducted during high risk periods during the season, encompassing 2,020 acres in aggregate. Survey and monitoring of both sites will continue in 2007. Detection surveys for Tropical Soda Apple continued also in other counties throughout the state at sites where veterinary certificates indicated livestock were introduced from Florida.

An unconfirmed report of Tropical Soda apple sightings in Stokes County was registered with the Staff Weed Specialist by a county extension agent on December 20. Control measures and plans for survey of the affected land will be done upon confirmation of the sightings.

Giant Salvinia

Giant Salvinia (*Salvinia molesta*), a Federal Noxious Weed, was detected at an aquatic nursery's display at the North Carolina State Fair in 1998, and subsequent surveys by NCDA&CS, NCDENR, and NCSU personnel have resulted in detections in 26 counties in North Carolina. Most of these infestations have been eradicated. However, in September 2000, naturalized infestations of Giant Salvinia were detected in golf course ponds in New Hanover County and in a canal and wetland at the Riverbend subdivision near Burgaw in Pender County. Acting under the authority of the Aquatic Weed Control Act of 1991, NCDENR Water Resources personnel began eradication treatments at these sites in November, 2000. Survey of the Northeast Cape Fear River and adjacent wetlands at the Pender County site yielded no new finds of Giant Salvinia in 2005 or in 2006. However, two storm events in 2006 (Hurricane Ernesto and a strong "Noreaster" in November) with concomitant flooding have been a cause for concern. The November storm may have caused some of the Salvinia to escape into the Cape Fear drainage system and survey was completed by the Salvinia Task Force in December to confirm potential establishment of Salvinia beyond the River Bend canal system. Results from that survey are pending and will be reported at the North Carolina Aquatic Weed Control Council (NCAWCC) meeting on 3/1/2007. Survey and necessary control measures will continue at all sites in 2007.

A biological control program for Giant Salvinia at the Pender County site was initiated in 2004 with two releases of the Salvinia Weevil (*Cyrtobagous salviniae*) in June and September. Observations throughout 2005 confirmed the successful overwintering and survival of the Salvinia Weevil in Pender County. However, surveys at the site in 2006 confirm that the weevil has not been successful in eradicating Salvinia even though it has been successful in significantly reducing Salvinia distribution and densities. Agency personnel participated in the Northeast Cape Fear Giant Salvinia Task Force, which was organized in 2002 and will develop closer liaison with the Task Force in 2007 to help develop 2007 plans for survey and control.

Tropical Spiderwort or Benghal Dayflower

Tropical Spiderwort (TSW) (*Commelina benghalensis*) is a Federal Noxious Weed and Class A State Noxious Weed. It was detected for the first time in North Carolina in 2001 at the Cherry Research Farm in Wayne County, where herbicide trials were being conducted. In 2003, the Tropical Spiderwort Advisory Committee was established to plan containment and eradication strategies. The committee continues to meet on a regular basis to provide input for survey, eradication and regulation strategies. The plan for 2007 will be compiled prior to the end of January.

Intensive survey by NCDA&CS' personnel in 2003, 2004, and 2005 detected infestations of TSW in a total of 26 fields at the Cherry Research Farm, and the infestations were delimited and mapped with GPS equipment. Outside of the Center for Environmental Farming Systems (CEFS) within the Cherry Research Farm, about 1,000 acres per week were surveyed in 2006 resulting in a new field location at the Thompson Farm border and confirmation of re-infestation at three fields. Fumigation of infested fields at the Cherry Research Farm began in 2004 and continued in 2005 and 2006 with a total of 36 acres fumigated in 2006. In the CEFS area, intensive survey, hand roguing, flame weeding and use of Alldown®, resulted in approximately 70% reduction of TSW in fields that contained 90% of the total observed emergence (Source: 12/07/06 TSW Advisory Committee report by Derek Frank, NCSU).

In addition to Cherry Research Farm, eight other research farms were surveyed in 2006 to determine if movement could have occurred via equipment that was used at the Cherry Research Farm. Surveys at the other eight farms showed NO DETECTS for TSW. The Tidewater Research Station at Plymouth, the NCSU Horticultural Field Laboratory in Raleigh, and Martin's Meats Abbatoir in Sampson County were surveyed again in 2006 due to detects in 2005. Surveys of these areas in 2006 showed NO DETECTS for Tropical Spiderwort.

Quarantines were continued through 2006 at the Cherry Research Farm and the Tidewater Research Station. Stipulations for registration of visitors and for washing of equipment were strictly monitored with excellent cooperation at both research stations. Inspections were completed at the NCSU seed processing facility to ensure compliance with agreements to control TSW seed that may move with soybean seed harvested from soybean breeding research plots. Arrangements were made to provide for incineration of seed cleaning waste that would be generated from the cleaning of seed originating in plots within quarantined areas.

Other initiatives within the Noxious Weed Program

- QPS use of methyl bromide is being evaluated to support the urgent needs of the North Carolina forest tree nursery industry. Regulatory language to permit such use under the Noxious Weed Regulations, as it currently is in other states, is being evaluated by the Staff Weed Specialist with guidance from the Director of the Plant Industry Division.
- The NCDA&CS is taking active part through the Noxious Weed Program in evaluating the opportunity to make North Carolina a center of excellence for invasive/noxious weed issues that impact the East Coast. A core group of people convened by North Carolina State University (NCSU) Weed Scientists has discussed ideas and needs to develop an Invasive Species Institute at NCSU. The institute would provide a clearing house for outreach, education and research targeting invasive species issues.
- The NCDA&CS' Plant Industry Division, Noxious Weed Program is compiling a state by state listing of noxious weeds across the country. The list is intended for use by the National Plant Board as a reference at the National Plant Board website.
- A grant has been submitted by the Staff Weed Specialist to the Fish and Wildlife Foundation to obtain 2007 funding under the Foundation's "Pulling Together Initiative Grant" to eradicate Bushkiller (*Cayratia japonica*) from a site near Winston-Salem, North Carolina. Background on bushkiller is contained in the following abstract submitted to the 2006 annual meeting of the Northeastern Weed Science Society by Dr. Rob Richardson and others at NCSU.

"Bushkiller [*Cayratia japonica* (Thunb.) Gagnep.] is an aggressive, perennial vine in the grape family (Vitaceae). Prior to 2005, this exotic species was only known to occur in North America in the Texas to Mississippi area. Bushkiller is somewhat similar in appearance to Virginia creeper [*Parthenocissus quinquefolia* (L.) Planch.]. Both species bear leaves of five leaflets with serrated margins. However, bushkiller is herbaceous with a terminal leaflet larger than the other four leaflets providing a distinct appearance. Tendrils are opposite from leaves and do not have adhesive discs like Virginia creeper. The flowers are small yellow clusters and have not produced viable seed in North Carolina. In August 2005, an unknown weed sample was submitted to North Carolina State University for identification. This plant sample was soon recognized as bushkiller [*Cayratia japonica* (Thunb.) Gagnep.] and confirmed by herbaria samples. Local extension agents and homeowners were immediately contacted to arrange a site visit. By September, scientists from NCSU, APHIS, and USGS had visited the site in Winston-Salem, North Carolina, to assess the situation. A small task force was then created to develop and execute an eradication plan. The task force obtained limited funding to begin eradication procedures in 2006. The plan consisted of foliar applications, cut-stem treatments, and handweeding of the infested site. Greenhouse trials indicated that triclopyr was the most efficacious herbicide on bushkiller with adequate selectivity for use on the infested site. NCSU personnel, county extension agents, and local volunteers participated in the eradication efforts with support of the affected homeowners. While vigor and density of the

bushkiller population has been reduced, treatments will need to be continued at least through 2007 before complete eradication could be possible. Extension agents and the general public have not reported this species at any other sites in North Carolina.”

Weed -Related Public Service Activities

Weed-related questions were answered for members of the general public including farmers, homeowners, NCSU personnel and NCDA&CS’ personnel. Typical questions included the following topics:

- Weed Identification
- Noxious Weed quarantine inquiries
- Weed control
- Turf maintenance for lawns and pastures

Questions or issues that required considerable input and research would typically be referred to the appropriate NCSU extension agents.

Support Operations

The NCDA&CS’ Support Operations Facility is located on the Dorothea Dix Campus. Present staff includes three full time and three temporary employees. The Support Operations Unit is responsible for supplying and maintaining vehicles, equipment, and trucks for each program. Additionally, Support Operations’ personnel are frequently required to assist in the implementation of field activities as requested. The Support Operations Unit provides maintenance and repairs on over 120 vehicles, 25 Gator, Mule, Polaris, Kawasaki, Suzuki and Arctic Cat ATV’s, 48 trailers and tractors. The Support Operations Unit also provides ongoing maintenance for the Support Operations Facility, NCDA&CS’ Beneficial Insect Lab, NCDA&CS’ Plant Industry Crossnore Station, Witchweed Methods Shop, NCDA&CS’ Blue Ridge Road Greenhouse and the Old Health Building.

Support Operations’ activities for 2006 included the following:

Gypsy Moth Program

Support Operations’ personnel assisted with aerial spray treatments across the state. Staff members assisted with survey and detection activities throughout the state. Staff also provided trucks, equipment and supplies for temporary personnel. Support Operations has taken responsibility for Gypsy Moth Trap assembly through the North Carolina Department of Corrections (NCDOC).

Boll Weevil Eradication Program

All traps and supplies were warehoused at the Support Operations Unit and distributed to program contractors. Support Operations’ staff provided vehicles, supplies and equipment to quality control personnel.

Sweet Potato Weevil Program

Staff provided direct support for full time and temporary personnel responsible for placing over 10,000 traps. Staff provided vehicles, supplies and equipment for temporary personnel.

Plant Conservation Program

Numerous activities were conducted with the Plant Conservation Program. Support Operations' staff members assisted with site preparation for prescribed burns, habitat restoration, prescribed burns, surveys and debris removal. Members of Support Operations' staff and Plant Conservation staff have been working actively to find equipment to be used in the Plant Conservation Program. During December, staff members attended wildland firefighter refresher training to better support program needs for this section of the division.

Division Safety

Based on new departmental policies, members of the Support Operations' staff evaluated numerous options and helped steer the Division Safety Committee on the most beneficial format to present effective safety training to meet the needs and goals of the Department. New methods of Aerial and Ground Application Safety Practices are continually evaluated and implemented as needed.

Emergency Programs

Support Operations' staff have actively assisted NCDA&CS' Emergency Programs, North Carolina Department of Crime Control and Public Safety (NCDCC&PS), Office of Emergency Management and USDA APHIS Emergency Programs with both storage and planning/implementation of numerous initiatives related to disaster recovery activities, as well as storage and maintenance of critical emergency response equipment.

Support Operations' staff also assisted with or supported other programs. These included surveys and/or treatments for Giant Salvinia, Imported Fire Ant, Itch Grass, Purple Loosestrife, Tropical Soda Apple and Tropical Spiderwort, as well as other pests and numerous plant diseases.

Members of the staff are actively involved in renovations to the Old Health Building. This role will continue as Phase II of renovation is currently in the planning stage.

Several programs require specialized equipment prepared by Support Operations' staff. The staff members at Support Operations are frequently called on to make modifications to equipment. Both the Raleigh shop and Whiteville shop are equipped to fabricate and modify equipment to meet program and Departmental goals and objectives.

SEED SECTION

The Seed Section of the Plant Industry Division continues to serve three main functions, all related to the sale of quality seed in North Carolina. (1) A regulation inspection program, (2) seed testing laboratory to test for quality factors including purity, germination, TZ and other related tests, and (3) a seed pathology program to provide seed health services.

The Seed Board has the responsibility to arbitrate issues when farmers and other seed consumers allege that seed have not performed as labeled or warranted. There were a total of six seed complaints that were resolved before arbitration in 2006. Members of this board, appointed by the Commissioner of Agriculture, are as follows: Gene B. Cross, NCDA&CS, Chairman; Eddie Martin, NCDA&CS (Alternate); Larry Wooten, farmer; Peter Daniel, farmer (Alternate); Kyle Edwards, North Carolina Seedsmen's Association; Jim Martin, North Carolina Seedsmen's Association (Alternate); Dr. Janet F. Spears, North Carolina Cooperative Extension Service (NCCES); Dr. Daryl Bowman, NCCES (Alternate); Dr. Ramsey Lewis, North Carolina Agricultural Research Service (NCARS), and Dr. Andrea Cardinal, NCARS (Alternate).

Seed Inspection

North Carolina Seed and Fertilizer Inspectors inspected agricultural, lawn turf and vegetable seeds at retail and wholesale seed dealers. Four thousand two hundred fifty-one Seed Dealer Licenses were issued in 2006. Seeds are checked for compliance to labeling requirements and quality standards of the North Carolina Seed Law. Seed and Fertilizer Inspectors made 5,129 dealer visits and collected 2,862 official seed samples from the 45,127 seed lots inspected. A total of 102 stop sale orders were issued for non-compliance with the North Carolina seed standards and an additional 1,406 stop sales were resolved on site. The total stop sales amounted to 1,508 by inspectors and another 242 issued by the seed lab after quality tests were run.

The cooperative program with North Carolina State University (NCSU) was continued by collecting samples from 38 lots of flue-cured tobacco seed for planting the grow-outs in the NCSU variety verification program. All seed lots that were tested were found truthfully labeled as to variety and recommended to be offered for sale by the Tobacco Seed Committee. The committee is made up of Dr. Steven Leath, Director, NCARS, Chairman; Dr. W. K. Collins, NCARS; Dr. David Smith, NCSU; David Davenport, farmer; Milton Beaman, seedsman; R. J. Raynor, producer, and Eddie Martin, NCDA&CS.

Seed and Fertilizer inspectors sampled 292 seed lots used on North Carolina Department of Transportation (DOT) highway projects. The sampling and testing of these seed lots are vital to DOT's seed quality assurance program. Some lots submitted for testing for DOT were stopped in the laboratory for violations of the North Carolina Seed Law and Regulations. Those not in compliance with the NCDA&CS and DOT minimum standards were rejected for use by DOT also. Eighty-three additional service samples were tested for NCDOT also.

Seed Testing

The Seed Testing Laboratory has dual roles of providing seed testing support for the regulatory program and seed quality data for North Carolina seed dealers, seed producers, farmers, university researchers and other seed consumers. Seed producers and dealers use seed testing data to make management decisions about seed stocks and for labeling purposes. The laboratory

received 6,598 service seed samples and 2,862 regulatory samples for testing. A total of 12,901 individual tests were conducted on these samples. Routine tests provide purity (including noxious weed seed examination) and germination information. Special tests include seed lot vigor and variety purity information. Other special tests include: tetrazolium, accelerated aging, cool test of cotton, cold test of hybrid corn, phenol, Roundup Ready tolerance, sand, and moisture testing. These special tests amounted to 559 official, 418 service and 70 administrative. The Laboratory has provided special testing for phytosanitary certificates required for the exportation of seed lots.

The Seed Laboratory is an active member of the Association of Official Seed Analysts. Rule changes and new research are presented and discussed. Rules are voted on and become part of accepted procedure.

The Laboratory is in the process of developing a new computer program for reporting the testing and tracking of seed samples in the laboratory. This is a very complex process, which requires the building and updating of several new databases as well as addressing the future of data collection and reporting.

Plant Pathology

The Tall Fescue Endophyte Testing Program continues to accept samples from both in-state and out-of-state sources. Many other testing labs, including some of those connected with universities, have discontinued their services. The NCDA&CS' Tall Fescue Testing Service is now one of a few that still accepts samples. The web page for this service has garnered a great deal of attention in internet searches for fescue problems, resulting in questions, if not samples, on a weekly basis. In 2006, the laboratory processed a total of 58 endophyte samples. Forty-three (43) of those samples were pasture samples; fifteen (15) were seed samples. Of the 15 seed samples, nine (9) were official samples for the Seed Testing Laboratory and six (6) were service samples or samples submitted for testing by the public. This increase in publicly submitted seed samples is new and a direct result of the web page. Also, the laboratory performed a grow-out test to verify the viability of any endophyte fungus in seed. This test was performed for USDA-ARS in Oklahoma and they also found our service on the internet.

Education

Every year our Plant Industry Division has the opportunity to share our knowledge and expertise with others. We entertain many international visitors with visits and tours. Our Seed Lab is a popular attraction for all visitors. We also had the opportunity to teach four classes at NCSU to agricultural and horticulture students on seed production, seed testing, and seed pathology. Other exhibits included the Southern Farm Show in Raleigh, and the Corn, Soybean, and Small Grain Association Convention in New Bern.

Biotechnology

The Seed Section has the responsibility for the biotechnology issues within Plant Industry. This responsibility includes reviewing the permits issued by USDA for field tests of genetically engineered crops. The Seed Section had reviewed and approved 187 GMO permits in 2006. This also included helping over see and approve GMO research on the NCDA research units across the state and Ventria Bioscience's GM rice production in Plymouth.

FERTILIZER SECTION

The Fertilizer Section implements the North Carolina Fertilizer Law, the North Carolina Agricultural Liming Materials and Landplaster Act, and the North Carolina Soil Additives Act. The overall goal of the program is to assure consumers, distributors, and manufacturers of the quality of fertilizers, agricultural liming materials, landplaster, and soil additives in the channels of trade in North Carolina. To accomplish this goal, Fertilizer Section staff randomly sample fertilizer and lime to (1) assure products in the marketplace are true to grade, (2) enforce labeling requirements, and (3) test for potentially contaminated products. We have streamlined the section by combining the duties of the seed and fertilizer inspectors. These employees have been cross-trained and are now implementing both the seed and fertilizer regulatory field inspections. In FY 2006, penalties totaling \$223,198 were assessed on fertilizer and lime in North Carolina. Also during the year, 31 'Stop Sale, Use, or Removal' orders were issued on fertilizer and lime in North Carolina and an additional 35 stop sales were resolved on site. The following information summarizes the different parts of the program and accomplishments of FY 2005-2006.

North Carolina farmers and other consumers of fertilizer and lime took advantage of early and mild spring conditions during 2006. In doing so, fertilizer tonnage usage was up approximately 8% and lime tonnage applied increased approximately 16.5%. The North Carolina fertilizer industry is still undergoing changes with outlets servicing larger territories as farmers increase their farm sizes.

Fertilizer Bioassay Program

The Fertilizer Bioassay Program received 115 samples in 2006. Samples were taken by Fertilizer Inspectors and ground for testing by the Feed and Fertilizer Analysis Lab with the Food and Drug Division. Of the total number of samples, 112 were routine samples and three were complaints. All samples were negative for herbicide contamination.

Tables 1 and 2 on the following page indicate data of fertilizer samples analyzed and liming materials and landplaster samples analyzed for FY 2006 compared to the previous four years.

The eight specialists in place made a total number of 5,129 dealer visits and a total of 23,494 inspections for the fiscal year 2006.

Fertilizers

Table 1: data of fertilizer samples analyzed for the 2006 fiscal year compared to the previous four years

FERTILIZER SAMPLING AND TONNAGE						
<u>Year</u>	<u>#Samples</u>	<u>#Compliant</u>	<u>%Compliant</u>	<u>Tonnage Reported</u>	<u>Tonnage Sampled</u>	<u>%Sampled</u>
2005-06	2,448	1,816	74.10	1,511,419	37,253	2.46
2004-05	2,662	2,065	77.57	1,400,426	44,352	3.17
2003-04	2,773	2,019	72.81	1,591,225	50,458	3.17
2002-03	3,468	2,621	75.58	1,399,516	299,488	21.39
2001-02	3,476	2,743	78.90	1,300,706	71,017	5.45

Liming Materials and Gypsum (Landplaster)

Table 2: data of liming material and landplaster samples reported for FY 2006 compared to the previous four years

LIME SAMPLING AND TONNAGE						
<u>Year</u>	<u>#Samples</u>	<u>#Compliant</u>	<u>%Compliant</u>	<u>Tonnage Reported</u>	<u>Tonnage Sampled</u>	<u>%Sampled</u>
2005-06	1,021	805	78.80	914,990	48,200	5.27
2004-05	1,114	959	59.16	784,620	60,885	7.76
2003-04	719	613	85.26	787,186	31,793	4.04
2002-03	770	618	80.26	695,564	112,286	16.00
2001-02	823	714	86.76	1,032,178	39,826	3.85

Liming material and landplaster tonnage reported in North Carolina increased by 16% during FY 2006 as compared to 2005.